MACROPHYTE DATA FROM 46 SOUTHERN ONTARIO SOFT-WATER LAKES OF VARYING pH

G.G. Hitchin, I. Wile, G.E. Miller and N.D. Yan

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DATA REPORT SERIES

The data presented in this report were collected by staff of the Aquatic and Terrestrial Ecosystems Section of the Water Resources Branch of the Ontario Ministry of the Environment as part of the Lakeshore Capacity Study or the Acid Precipitation in Ontario Study. This unreviewed report does not necessarily reflect the views or opinions of the Ontario Ministry of the Environment.

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PREFACE

The unpublished Data Report Series is intended as a readily available source of basic data collected for lakes and watersheds in the Muskoka-Haliburton area of Ontario. These data were collected as part of the Lakeshore Capacity Study and/or the Acid Precipitation in Ontario Study.

The limnological portion of the Lakeshore Capacity Study (1975-81) was initiated to investigate the relationships between lakeshore development and lake trophic status in low ionic strength Precambrian lakes. The Acid Precipitation in Ontario Study (1979 - present) was initiated, in part, to investigate the effects of the deposition of strong acids on aquatic and terrestrial ecosystems in Ontario. The primary findings of these studies have been and will continue to be published as reviewed papers and technical reports.

ABSTRACT

To determine the influence of lake acidification and trace metal contamination on aquatic plant communities, a survey was conducted of 46 lakes of varying pH and metal levels in southern Ontario. The occurrence, distribution and abundance of vascular and non-vascular aquatic macrophytes in these lakes is detailed in this report. Maps are also presented showing locations of all sampling transects.

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Introduction

Personnel of the Limnology Unit of the Ontario Ministry of the Environment surveyed the aquatic macrophyte communities of 46 soft-water Canadian Shield lakes on one occasion during the summers of 1977, 1978 or 1979. The survey was performed with two general purposes: firstly, to determine if the acidification of lakes in Ontario has produced changes in the richness, composition, abundance and/or distribution of vascular and non-vascular communities of aquatic macrophytes; secondly, to examine regional patterns of accumulation of potentially toxic trace metals in common macrophyte species. Three of the lakes were sampled more frequently and intensively to determine if the acidification and/or trace metal contamination of Ontario lakes might alter the standing stock of macrophyte communities. Most results of these investigations are presented elsewhere (Wile and Miller 1983, Miller et al., 1983, Wile et al., 1985 and Yan et al. in prep.). Methodological details of the survey and detailed data on plant occurrences are provided in this report. Information on depth distribution of species and nominal expressions of plant cover abundance are also presented as these aspects of the data are not presented elsewhere.

The study lakes were located in the Sudbury, Killarney, Parry Sound and Haliburton-Muskoka regions

of Ontario (Fig. 1, Table 1). Several of the Sudbury and Killarney lakes were very acidic (Table 1), and many lakes close to Sudbury were additionally contaminated with trace metals, Cu and Ni in particular. Elevated levels of these metals are attributable to industrial operations in the Sudbury area (Ontario Ministry of the Environment, 1982). Six of the lakes have been chemically manipulated in recent years by additions of base (Middle, Hannah, Lohi and Nelson Lakes), or nutrients (Labelle Lake) as described by Ontario Ministry of the Environment (1982) or alkaline waters (Lake #8 of Gorham and Gordon, 1963). With the exception of Labelle Lake, all these manipulations resulted in substantial elevations in lake pH.

METHODS

Chemistry

In 1978 and 1979 lake water pH was measured in the field during the macrophyte survey. Measurements were taken *in situ* in 1 to 3 of the macrophyte sampling areas (see below) with a Radiometer Model 29 pH meter. The probe was calibrated using buffer solutions of pH 4 and 7 prior to the first measurement on each lake, and readings were taken after the meter had stabilized (<5 min.). The pH data for the 4 lakes sampled in 1977 were means for the ice-free season for whole lake

composite samples taken from Ontario Ministry of the Environment (1982).

Metal concentrations of surficial sediments were determined for all lakes as described by Miller et al. (1983). Where no other analyses were available, metal analyses of lake water were performed on epilimnetic composites taken with a 2.5 cm diameter plastic tygon tube, dispensed into acid-washed plastic bottles and analysed by methods described elsewhere(Ontario Ministry of the Environment, 1981). Trace metal concentrations for the other lakes were assembled from a variety of sources. Superscripts listed below identify these sources in Table 1.

[1]this study

[2]mean ice-free period whole lake composite for 1978, or 1977 for Swan Lake (Ontario Ministry of the Environment, 1982).

[3] whole lake arithmetic mean of 1978 and 1979 data (Ontario Ministry of the Environment, unpublished data).

[4]mean of 1-4 epilimnetic composite samples from 1979 and 1980 (Ontario Ministry of the Environment, unpublished data).

[5]mean ice-free period whole lake composite for 1980 (Ontario Ministry of the Environment, unpublished data).

[6]mean of 1-3 epilimnetic composite samples for 1982

(Keller, unpublished data).

Secchi transparencies were also taken from various sources. Superscripts listed below identify these sources in Table 4.

[1]mean of 3-4 summer values for 1979 (Ontario Ministry of the Environment, unpublished data).

[2]ice-free season mean for the year of sampling (Ontario Ministry of the Environment, unpublished data).

[3]ice-free season mean for the year of sampling (Ontario Ministry of the Environment, 1982).

[4]mean of 5 values from 1975 to 1976 (Ontario Ministry of the Environment, 1978).

[5]Bleiwas (1980).

[6]Stokes (unpublished data).

[7]mean ice-free season data for 1972 (Ontario Ministry of the Environment, unpublished data).

Macrophytes

Following a preliminary visual examination of each lake, 1-31 sampling sites (usually 5-15) were selected for detailed survey, the number of sites determined by lake size and heterogeneity of the aquatic plant community. Sites of generally high richness (eg. shallow bays and the zone near stream mouths) and low richness were visited. At each site an approximately 10 m wide transect extending from shore to the maximum

depth of plant growth was examined by divers using snorkeling and/or scuba gear. Numbers of transects varied widely among the lakes, but the species richness of vascular macrophytes was not correlated with numbers of transects visited (Figure 2).

Four of the lakes were surveyed in a slightly different way. Divers surveyed the entire perimeter of two small lakes, Kramer Lake and lake #14 of Gorham and Gordon (1963). These lakes are identified as having only 1 transect. The biomass sampling program necessitated surveying the entire shoreline of Harp and Red Chalk Lakes. Hence, "transects" were long segments of shoreline for these two lakes.

Significant changes in plant cover abundance and composition along the transects, usually coinciding with changes in depth, were used to divide transects into "depth zones", areas of similar relative occurrence and relative and total abundance of species. The occurrence of all species of Tracheophyta (vascular plants), aquatic Musci (bryophytes) and Charophyta (stoneworts) was recorded within each depth zone. Additionally, the total bottom coverage of all plants and, independently, of each species was visually estimated within each depth zone, and assigned to 3 nominal categories: <5%, 5-50% and 50-100% cover.

Ten and 29 lakes were surveyed during the summers of 1978 and 1979, respectively. The 4 lakes surveyed in 1977 (Labelle, Middle, Nelson and Swan) received a

somewhat more cursory examination. The three additional lakes sampled in 1978 as part of the macrophyte biomass study were surveyed more intensively and on 4 occasions during the icefree season.

Tables A1 to A46, in this report, present sampling dates, numbers of transects sampled, species richness and occurrence, and cover abundance rankings for each species and for the entire plant community for each depth zone on each transect for each lake. Transect locations and additional information are indicated in Figures A1 to A46.

Macrophyte Occurrence, Depth Distribution and Abundance

A total of 79 plant species were identified. Fifty were vascular macrophytes (Table 2), 23 were aquatic mosses and 6 were stoneworts (Table 3). Maximum depths of occurrence of plants in each lake are given in Table 4. There was a positive relationship between maximum plant depth and water clarity as measured by Secchi depth ($r = 0.48$, $p < 0.005$, $n = 35$) as has been frequently observed (Hutchinson 1975).

The range of depths of plant occurrence varied among species (Fig. 3), generally resulting in a vertical zonation of species. Shallow areas (0 - 2m) were usually populated by species with rosette growth forms, particularly *Eriocaulon septangulare* and *Eleocharis acicularis*, and by species with floating

leaves. Isoetes sp., Utricularia vulgaris, U. purpurea and/or Potomogeton confervoides normally dominated deeper waters from 2 to 6 or occasionally 8m. In 15 of the 46 lakes stoneworts and mosses extended the limit of plant growth beyond that reached by the vascular macrophytes (Table 4).

Thirty-one of the fifty macrophyte species occurred in 5 or more lakes, and 14 of these attained 50% bottom cover along at least one transect in 1 or more lakes. These 14 species were ranked in terms of their frequency of occurrence in the lakes and the proportion of lakes in which they attained 50% bottom cover along a transect using data from Table 5. The resulting ranks of frequency and cover abundance are illustrated in Figure 4. In decreasing order, the five most frequently encountered taxa were Eriocaulon septangulare, Eleocharis acicularis, Nuphar variegatum, Isoetes spp. and Juncus pelocarpus. The five most frequently abundant taxa were Eriocaulon septangulare, Myriophyllum tenellum, Potomogeton confervoides, Isoetes spp. and Utricularia purpurea (Figure 4).

Total plant cover in the 46 lakes was compared as follows. The maximum reported cover abundance of all aquatic plants on each transect, i.e., for a depth zone on the transect, was assigned to one of the three nominal cover abundance categories of low cover (<5%), moderate cover (5 - 50%) or high cover (>50%). The

proportion of all transects exhibiting each abundance ranking for each lake is compared in Figure 5. Lakes are arranged generally in order of decreasing proportional cover abundance.

There is an apparent relationship between plant cover abundance and lake pH evident in Figure 5. Plant cover exceeded 50% on proportionately more transects in the acidic lakes. This pattern is more evident in Figure 6, which gives scattergrams of the relationship between pH and the proportion of transects on each lake with high, moderate or low cover. This observation substantiates observations from the three lakes in which biomass was determined by destructive harvesting of large numbers of quadrats (Wile et al., 1985).

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5. Distribution in three cover abundance rankings of the maximum reported cover in each lake for 31 common vascular macrophytes. Number of lakes in which each species occurred is also indicated.

Table 1. Summary of locations, pH and Ni levels of the survey lakes. Region codes are 1(Muskoka-Haliburton), 2(Killarney), 3(Parry Sound) and 4(Sudbury). Lake codes are used to identify the lakes in subsequent tables. Superscripts for Ni are given in text.

Lake	Lake Code	Region	Township	pH	Ni ($mg\ m^{-3}$)
Axe	1	3	Monteith	4.4	$<2^{1}$
Bell	2	2	Groschen	4.8	11^{6}
Brandy	3	1	Watt	6.4	2^{4}
Carlyle	4	2	Carlyle	4.6	6^{6}
Chub	5	1	Ridout	6.2	$<2^{3}$
Cinder	6	1	Hindon	5.3	$<2^{4}$
Clear	7	1	Oakley	6.4	$<2^{4}$
Clearwater	8	4	Tilton & Broder	4.4	260^{2}
Crosson	9	1	Oakley	5.3	$<2^{3}$
Dickie	10	1	McLean	6.0	$<2^{3}$
Fawn	11	1	Macaulay & Stephenson	5.3	$<2^{3}$
Freeland	12	2	Killarney	4.3	$<20^{1}$
Frood	13	2	Curtin	6.6	5^{1}
George	14	2	Killarney	4.8	6^{6}
G. & G. 4[1]	15	4	Garson	5.1	120^{1}
G. & G. 8[1] (Norway)	16	4	Garson	6.9	58^{1}
G. & G. 14[1]	17	4	Garson	3.9	660^{1}
G. & G. 21[1]	18	4	Broder	5.5	220^{1}
G. & G. 54[1] (Clara Belle)	19	4	Snider	4.7	3700^{1}
G. & G. 75[1]	20	4	Cleland	5.2	85^{1}
G. & G. 94[1]	21	4	Dowling	5.7	$<2^{1}$
G. & G. 103[1]	22	4	Moncrieff	6.0	3^{1}
Gullfeather	23	1	Oakley	5.8	$<2^{3}$
Hannah	24	4	Broder	7.1	310^{2}
Harp	25	1	Chaffey	6.8	$<2^{3}$
Healey	26	1	Macauley	5.6	$<2^{4}$
Heney	27	1	McLean	5.5	$<4^{3}$
Hillman	28	1	Monck	6.3	-
Horn	29	3	Monteith	4.2	$<2^{1}$
Kramer[2]	30	2	Curtin	4.0	4^{1}
Labelle	31	4	Lumsden	6.3	19^{2}
Leech	32	1	Oakley	5.7	$<3^{4}$
Leonard	33	1	Monck	5.5	3^{4}
Little Clear	34	1	Sinclair	6.9	$<2^{3}$
Little Otter	35	3	Foley	6.5	-
Lohi	36	4	Broder	4.8	240^{2}
McKay	37	1	Draper	5.6	$<3^{4}$
Middle	38	4	Broder	6.5	350^{2}
Moot	39	1	McLean	5.9	2^{4}
Nelson	40	4	Bowell	6.4	7^{2}
Otter	41	3	Foley	6.4	-
Plastic	42	1	Sherborne	5.2	$<3^{5}$
Red Chalk	43	1	Ridout	6.6	2^{3}
Solitaire	44	1	Sinclair	7.0	$<2^{3}$
Swan[3]	45	4	Broder	3.9	300^{2}
Terry	46	2	Carlyle	4.5	22^{6}

[1] from Gorham and Gordon (1963)
[2] identified by principal investigator
[3] local name only

Table 2 Occurrence of vascular macrophytes in the survey lakes. Lake codes are given in Table 1.

TAXA		LAKE CODE																						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Brasenia Schreberi Gmel.	21	x	x	x	x	x	x	x		x	x	x	x	x	x							x		x
Callitriche sp.	1																							
Ceratophyllum demersum L.	1													x										
Elatine minima (Nutt.) Fisch.&Meyer	12			x	x		x				x			x	x									
Eleocharis acicularis (L.) R.&S.	38	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x
Eleocharis Robbinsii Oakes	9		x		x					x				x										
Elodea sp.	2													x										
Eriocaulon septangulare With.	39	x	x	x	x	x	x	x	x	x	x	x	x	x	x				x		x	x	x	x
Isoetes sp.	31		x	x	x	x		x		x	x	x	x	x	x						x	x	x	x
Juncus militaris Bigelow	20	x	x		x		x			x	x	x	x	x							x	x	x	x
Juncus pelocarpus Meyer	30	x	x	x	x			x	x		x	x		x									x	x
Juncus sp.	1																						x	
Lobelia Dortmanna L.	27	x	x		x	x		x		x	x			x	x	x	x			x				
Lycopus sp.	24		x		x	x	x		x	x	x	x	x	x	x			x				x	x	x
Myriophyllum alterniflorum D.C.	1																					x		x
Myriophyllum Farwellii Morong.	6		x		x									x										
Myriophyllum tenellum Bigelow	24	x	x		x				x		x			x	x								x	
Myriophyllum heterophyllum Michx.	2						x							x	x						x	x	x	x
Najas flexilis (Willd.) R.&S.	5			x										x										
Nuphar variegatum Engelm.	32	x	x	x	x	x	x	x		x	x	x	x	x										
Nymphaea odorata Ait.	25	x	x	x	x	x	x			x	x	x	x	x	x	x	x		x		x	x	x	x
Nymphoides cordatum (Ell.) Fernald.	9	x	x		x	x								x							x	x	x	x
Polygonum natans Eaton	3						x							x										
Pontederia cordata L.	30	x	x	x	x	x	x	x		x	x	x	x	x	x									
Potamogeton amplifolius Tuckerm	2													x							x			x
Potamogeton Berchtoldii Fieber	6		x			x								x										
Potamogeton bicupulatus Fernald.	1													x									x	
Potamogeton capillaceus Poiret	5		x																					
Potamogeton confervoides Reichenb.	9	x	x		x							x		x										
Potamogeton epihydrus Raf.	27	x	x	x	x	x			x	x	x	x	x	x	x						x	x	x	x
Potamogeton foliosus Raf.	3		x											x										
Potamogeton natans L.	15	x	x			x			x		x	x	x	x									x	x
Potamogeton Oakesianus Robbins	9	x			x						x	x												x
Potamogeton obtusifolius Mert.&Kock.	2													x										
Potamogeton pusillus L.	3																x							
Potamogeton Richardsonii (Benn.) Rydb.	1													x										
Potamogeton Robbinsii Oakes	2													x										
Potamogeton Spirillis Tuckerm.	2													x										
Potamogeton Vaseyi Robbins	2																				x			
Ranunculus reptans L.	5			x										x	x									
Sagittaria sp.	18		x	x	x						x			x	x	x					x	x		
Sparganium sp.	31		x		x	x	x	x		x	x	x	x	x	x	x	x	x			x	x	x	x
Utricularia cornuta Michx.	3	x																						
Utricularia gibba L.	6	x									x			x							x	x		
Utricularia intermedia Hayne	6	x												x								x		
Utricularia minor L.	1																							
Utricularia purpurea Walt.	22	x	x		x	x	x			x	x		x	x	x							x	x	
Utricularia resupinata B.D. Greene	20	x	x	x	x	x		x		x	x	x												x
Utricularia vulgaris L.	29	x	x		x		x		x	x			x	x	x							x	x	
Vallisneria americana Michx.	8		x	x							x			x										
Total Number of Taxa		21	27	14	24	15	12	12	12	6	17	18	19	16	39	19	5	6	2	3	2	9	16	19	17

Table 2. Occurrence of vascular macrophytes in the survey lakes. Lake codes are given in Table 1. Cont'd

TAXA		LAKE CODE																					
		24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Brasenia Schreberi Gmel.	21			x	x	x	x								x									x
Callitriche sp.	1												x											
Ceratophyllum demersum L.	1																							
Elatine minima (Nutt.) Fisch.&Meyer	12									x	x		x						x	x		x		
Eleocharis acicularis (L.) R.&S.	38	x	x	x	x		x			x	x	x	x	x	x	x	x	x	x	x	x			
Eleocharis Robbinsii Oakes	9				x									x	x		x		x				x	
Elodea sp.	2												x											
Eriocaulon septangulare With.	39	x	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x		x
Isoetes sp.	31	x	x	x	x					x	x	x	x		x		x	x	x	x	x	x		x
Juncus militaris Bigelow	20			x	x	x	x						x		x			x		x				
Juncus pelocarpus Meyer	30	x	x	x	x	x				x	x	x	x	x	x	x		x	x		x	x		x
Juncus sp.	1																							
Lobelia Dortmanna L.	27		x	x	x				x	x	x	x	x		x		x	x	x	x	x	x		
Lycopus sp.	24				x		x	x		x	x	x	x		x		x		x					
Myriophyllum alterniflorum D.C.	1																							x
Myriophyllum Farwellii Morong.	6								x															
Myriophyllum tenellum Bigelow	24			x	x	x				x	x	x		x	x		x	x	x	x	x			
Myriophyllum heterophyllum Michx.	2																							
Najas flexilis (Willd.) R.&S.	5				x	x							x											
Nuphar variegatum Engelm.	32		x			x	x			x	x	x			x		x		x	x	x			x
Nymphaea odorata Ait.	25			x	x	x	x	x							x				x	x	x			
Nymphoides cordatum (Ell.) Fernald.	9			x	x						x													x
Polygonum natans Eaton	3						x																	
Pontederia cordata L.	30	x	x	x	x	x	x			x	x	x	x		x		x		x	x				x
Potamogeton amplifolius Tuckerm	2					x																		
Potamogeton Berchtoldii Fieber	6				x														x					
Potamogeton bicupulatus Fernald.	1																x							
Potamogeton capillaceus Poiret	5				x														x					
Potamogeton confervoides Reichenb.	9			x	x										x									x
Potamogeton epihydrus Raf.	27			x	x	x	x			x		x	x		x		x		x	x				x
Potamogeton foliosus Raf.	3						x																	
Potamogeton natans L.	15			x	x		x		x						x				x					
Potamogeton Oakesianus Robbins.	9				x		x				x				x									
Potamogeton obtusifolius Mert.&Kock.	2					x																		
Potamogeton pusillus L.	3					x									x									
Potamogeton Richardsonii (Benn.) Rydb.	1												x											
Potamogeton Robbinsii Oakes	2					x																		
Potamogeton Spirillis Tuckerm.	2												x											
Potamogeton Vaseyi Robbins	1																							
Ranunculus reptans L.	5												x											
Sagittaria sp.	18	x											x						x					
Sparganium sp.	31		x	x	x		x			x	x	x	x		x	x		x	x				x	x
Utricularia cornuta Michx.	3							x	x						x		x		x	x	x			x
Utricularia gibba L.	6				x																			
Utricularia intermedia Hayne	6			x		x																		
Utricularia minor L.	1		x																x					
Utricularia purpurea Walt.	22			x	x	x					x	x	x											
Utricularia resupinata B.D. Green	20	x		x	x	x				x	x				x		x		x	x	x			x
Utricularia vulgaris L.	29		x	x	x	x	x	x		x		x	x	x			x		x	x	x		x	x
Vallisneria americana Michx.	8			x								x	x		x									
Total number of taxa		7	10	20	25	18	14	4	5	14	15	14	20	6	22	4	14	8	23	15	11	5	4	14

Table 3. Occurrence of aquatic mosses (Musci) and stoneworts (Characeae) in the survey lakes. Lake codes from Table 1.

TAXA	no. of lakes	LAKE CODE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CHARACEAE																								
Chara vulgaris L.	1													x										
Nitella flexilis (L.) Ag.	7			x								x										x		
Nitella furcata (Roxb. ex Bruz) Ag.	2																							
Nitella gracilis (Sm.) Ag.	1																							
Nitella tenuissima (Desv.) Kutz.	10			x		x						x		x								x	x	
Nitella sp.	3													x										
MUSCI																								
Cladopodiella fluitans (Nees) Buch.	2								x									x						
Drepanocladus exannulatus (B.S.G.) Warnst.	8				x				x						x	x					x	x	x	
Drepanocladus sp.	8	x	x											x										
Fissidens fontanus (B. Pyl) Steud.	1											x												
Fontinalis antipyretica Hedw.	26	x		x		x	x	x		x	x	x		x								x		x
Fontinalis hypnoides duriaei	1									x														
Fontinalis duriaei Schimp.	2																							
Fontinalis nova-angliae Sull.	1																							
Fontinalis sp.	3		x		x										x									
Gymnocolea inflata (Huds.) Dum.	1		x																					
Hygroamblystegium tenax (Hedw.) Jenn.	1			x											x									
Pohlia nutans schimperii (Hedw.) Lindb.	4																							
Sphagnum cuspidatum Ehrh.	9	x	x		x			x				x				x		x		x				
Sphagnum fimbriatum	1					x																		
Sphagnum majus (Russ.) C. Jens.	1		x																					
Sphagnum palustre L.	2							x																
Sphagnum pylaesii Brid.	1				x																	x		
Sphagnum recurvum amblyphyllum	1				x																			
Sphagnum subsecundum contortum (Schultz) Hub.	6				x		x						x											
Sphagnum subsecundum inundatum (Russ.) (Jens)	1						x																	x
Sphagnum subsecundum platyphyllum Card.	10		x					x				x		x							x	x		
Sphagnum teres (Schimp.) Angstr.	1													x										
Sphagnum sp.	4					x																		
Total number of taxa		3	6	4	6	3	4	4	2	2	1	6	1	5	5	2	1	2	1	1	2	6	2	2

Table 3. Occurrence of aquatic mosses (Musci) and stoneworts (Characeae) in the survey lakes. Lake codes Con't. from Table 1.

TAXA	no. of lakes	LAKE CODE 24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
CHARACEAE																								
Chara vulgaris L.	1																							
Nitella flexilis (L.) Ag.	7		x							x		x			x									
Nitella furcata (Roxb. ex Bruz) Ag.	2												x						x					
Nitella aracilis (Sm.) Ag.	1				x																			
Nitella tenuissima (Desv.) Kutz.	10				x								x						x	x				
Nitella sp.	3					x			x															
MUSCI																								
Cladopodiella fluitans (Nees) Buch.	2																							
Drepanocladus exannulatus (B.S.G.) Warnst	8						x																	
Drepanocladus sp.	8	x								x				x				x					x	
Fissidens fontanus (B. Pyl) Steud.	1																							
Fontinalis antipyretica Hedw.	26		x	x	x		x			x	x	x	x		x		x		x	x	x	x		x
Fontinalis hypnoides duriaei	1																							
Fontinalis duriaei Schimp.	2												x		x									
Fontinalis nova-angliae sull.	1														x									
Fontinalis sp.	3																							
Gymnocolea inflata (Huds.) Dum.	1																							
Hygroamblystegium tenax (Hedw.) Jenn.	1																							
Pohlia nutans schimperii (Hedw.) Lindb.	4																							x
Sphagnum cuspidatum Ehrh.	9			x			x	x							x									
Sphagnum fimbriatum	1																							
Sphagnum majus (Russ.) C. Jens.	1																							
Sphagnum palustre L.	2																							
Sphagnum pylaesii Brid.	1																							
Sphagnum recurvum amblyphyllum	1																							
Sphagnum subsecundum contortum (Schultz) Hub.	6																		x					x
Sphagnum subsecundum inundatum (Russ.) (Jens)	1																							
Sphagnum subsecundum platyphyllum Card.	10						x								x				x	x				
Sphagnum teres (Schimp.) Angstr.	1																							
Sphagnum sp.	4		x		x						x													
Total Number of taxa		1	3	2	4	1	4	1	1	3	2	2	4	1	6		1	1	5	3	1	1	1	3

Table 4. Secchi transparency and maximum depth of occurrence of vascular macrophytes in the survey lakes. Moss and stonewort maximum depths are given where they exceed the deepest occurrence of vascular plants.

LAKE	Secchi Transparency (m)	Maximum Depth of Plants (m)		
		Vascular	Moss	Stonewort
Axe	1.5[1]	3.0		
Bell	5.5[4]	6.5		
Brandy	1.2[1]	1.3		
Carlyle	7.4[6]	6.0	10.0	
Chub	3.0[2]	2.5		
Cinder	2.5[1]	3.0	4.0	
Clear	8.0[1]	1.8		
Clearwater	9.7[3]	4.0	8.0	
Crosson	3.4[2]	2.0		
Dickie	3.0[2]	2.0	3.0	
Fawn	1.5[1]	1.5		2.3
Freeland	-	3.0		
Frood	5.4[5]	6.0		7.5
George	9.6[6]	8.0	18.0	
G.&G. 4	-	1.8	5.0	
G.&G. 8	-	3.0		
G.&G. 14	-	1.5		
G.&G. 21	-	2.5		
G.&G. 54	-	3.0	4.0	
G.&G. 75	-	5.0	8.0	
G.&G. 94	-	4.0		6.5
G.&G. 103	-	3.0		
Gullfeather	2.2[2]	1.5		
Hannah	4.5[3]	4.5		
Harp	4.3[2]	3.0		
Healey	1.7[1]	3.0		
Heney	4.1[1]	4.0		
Hillman	3.2[1]	3.0		
Horn	1.3[4]	2.2		
Kramer	-	5.0		
Labelle	3.8[3]	2.0		
Leech	4.4[1]	2.5		
Leonard	5.8[1]	4.0		
Little Clear	5.5[2]	1.7	2.0	
Little Otter	2.5[7]	4.0		
Lohi	9.3[3]	5.0	6.0	
McKay	2.6[1]	5.5		
Middle	4.3[3]	1.0		
Moot	1.5[1]	1.3		
Nelson	7.8[3]	4.5		
Otter	4.6[7]	6.0		
Plastic	5.6[1]	5.0	9.0	
Red Chalk	6.5[2]	4.0		
Solitaire	8.4[2]	3.5		
Swan	6.7[3]	2.0		
Terry	3.8[6]	6.0	8.0	

Table 5. Distribution in three cover abundance rankings of the maximum reported cover in each lake for 31 common vascular macrophytes. Number of lakes in which each species occurred is also indicated.

SPECIES	no. of Lakes	% of lakes with nominal abundance		
		<5%	5-50%	50-100%
Brasenia Schreberi	21	71	29	
Elatine minima	12	83	17	
Eleocharis acicularis	38	47	37	16
Eriocaulon septangulare	39	8	44	48
Isoetes sp.	31	45	32	23
Juncus pelocarpus	30	63	34	3
Juncus militaris	20	65	25	10
Lobelia Dortmanna	27	70	30	
Lycopus sp.	24	100		
Myriophyllum Farwellii	6	50	50	
Myriophyllum tenellum	24	33	29	38
Najas flexilis	5	40	60	
Nuphar variegatum	33	88	9	3
Nymphaea odorata	24	42	58	
Nymphoides cordatum	9	56	33	11
Pontederia cordata	30	90	10	
Potamogeton Berchtoldii	6	100		
Potamogeton capillaceus	5	60	20	
Potamogeton confervoides	9	44	22	34
Potamogeton epihydrus	27	74	26	
Potamogeton natans	15	93	7	
Potamogeton Oakesianus	9	100		
Ranunculus reptans	5	100		
Sagitarria sp.	18	61	33	6
Sparganium sp.	31	90	10	
Utricularia gibba	6	100		
Utricularia intermedia	6	100		
Utricularia purpurea	22	41	41	18
Utricularia resupinata	20	30	60	10
Utricularia vulgaris	28	75	18	7
Vallisneria americana	8	25	63	12

LIST OF FIGURES

1. Location of the survey lakes. Lake codes are given in Table 1.
2. Relationship between vascular macrophyte species richness and numbers of transects on each lake. Squares are lakes with > 50 mg of Ni m^{-3}. Note that richness is not related to numbers of transects for the Ni-contaminated lakes, or for the lakes with Ni levels <50 mg m^{-3}. Numbers indicate coincident points.
3. Depth ranges of observed occurrence of 31 species of vascular macrophytes which were present in 5 or more lakes.
4. Relationship between rank of frequency of occurrence and rank of proportion of lakes with maximum nominal bottom cover along any transect >50% for the 14 vascular macrophyte species which attained 50% bottom cover along any transect in 1 or more lakes.
5. Percentage of transects on each lake for which maximum cover abundance of aquatic macrophytes on a transect was >50% (shaded), 5 - 50% (vertical lines) or < 5% (clear). Lake pH's are symbolized as solid circles (pH <5.0), open circles (pH 5.0 - 6.0) or open squares (pH > 6.0).
6. Scattergrams of the relationship between pH and the percentage of transects for each lake exhibiting

nominal abundances of < 5, 5 - 50 and > 50% bottom cover. Lakes whose chemistry was manipulated as described in text are indicated by solid squares, other lakes by circles.

Figure 1

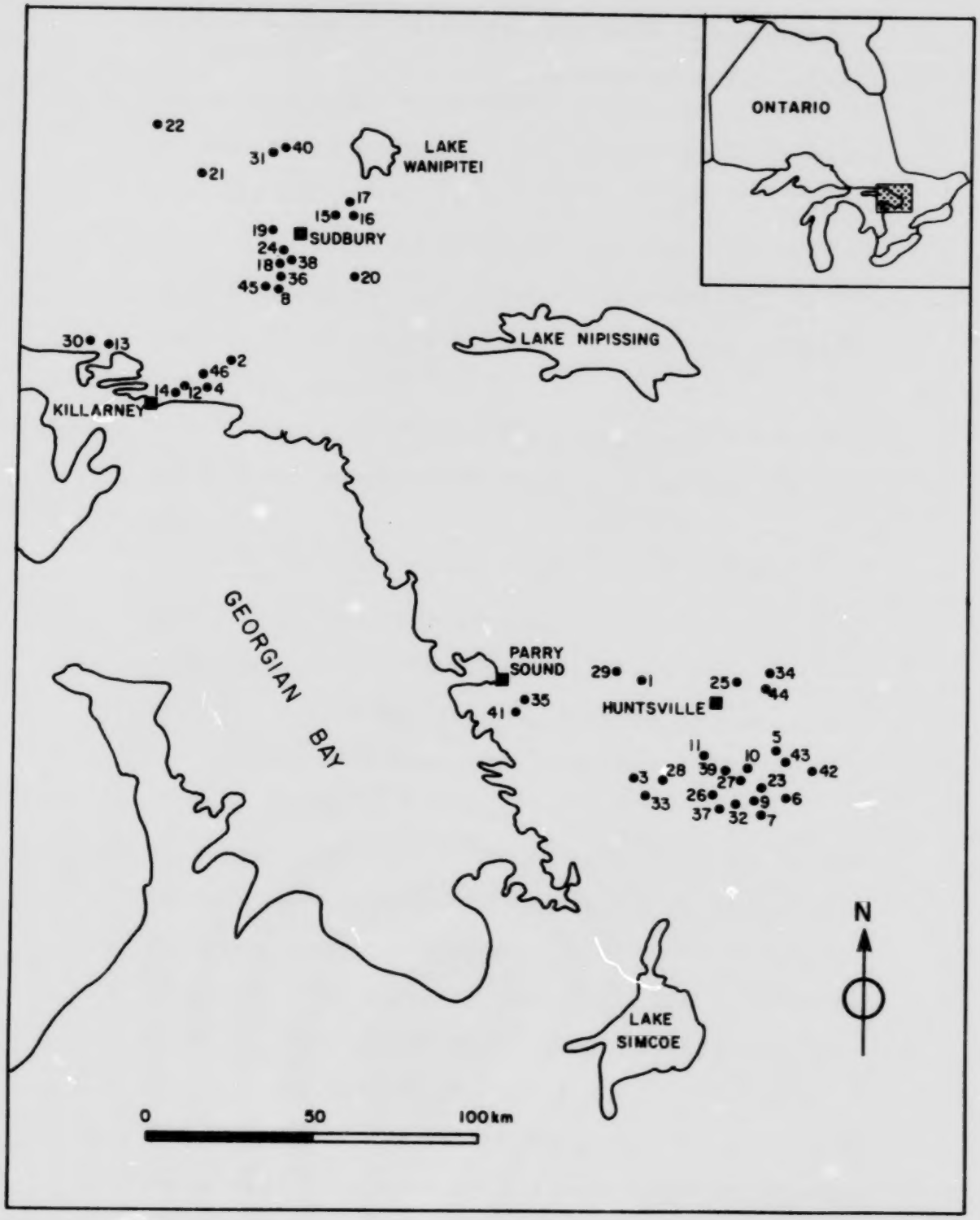

ONTARIO
LAKE WANIPITEI
SUDBURY
LAKE NIPISSING
KILLARNEY
GEORGIAN BAY
PARRY SOUND
HUNTSVILLE
LAKE SIMCOE
N
0
50
100km

Figure 2

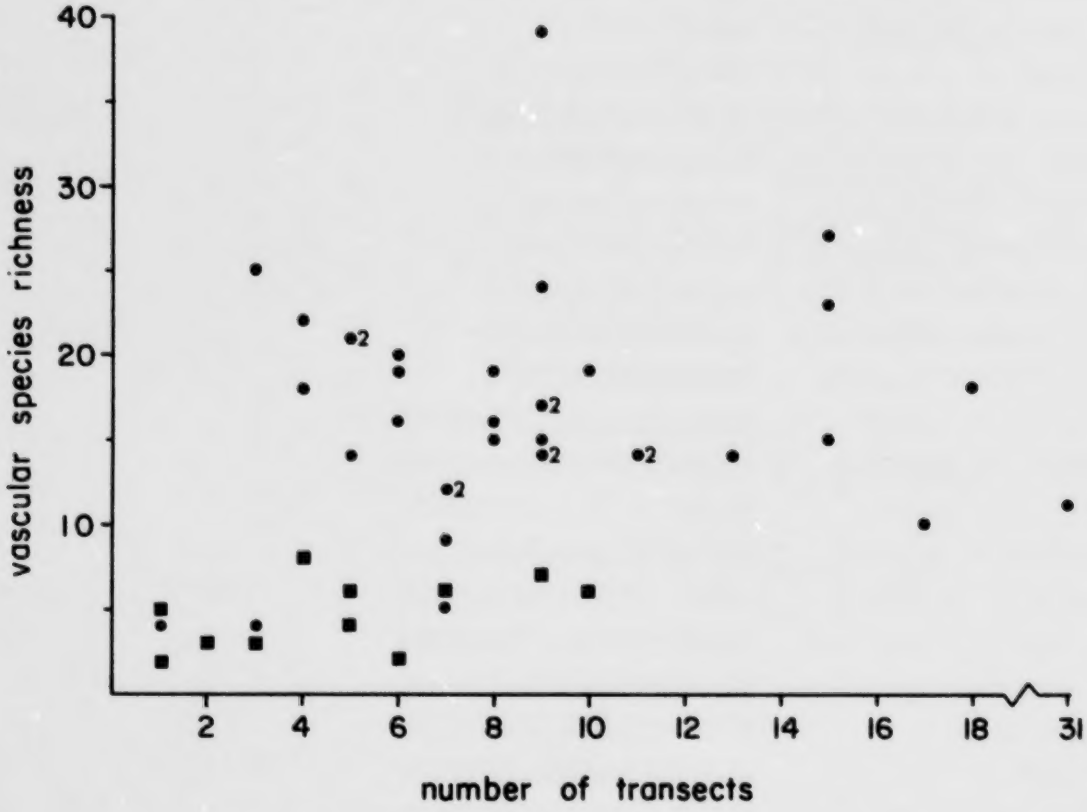
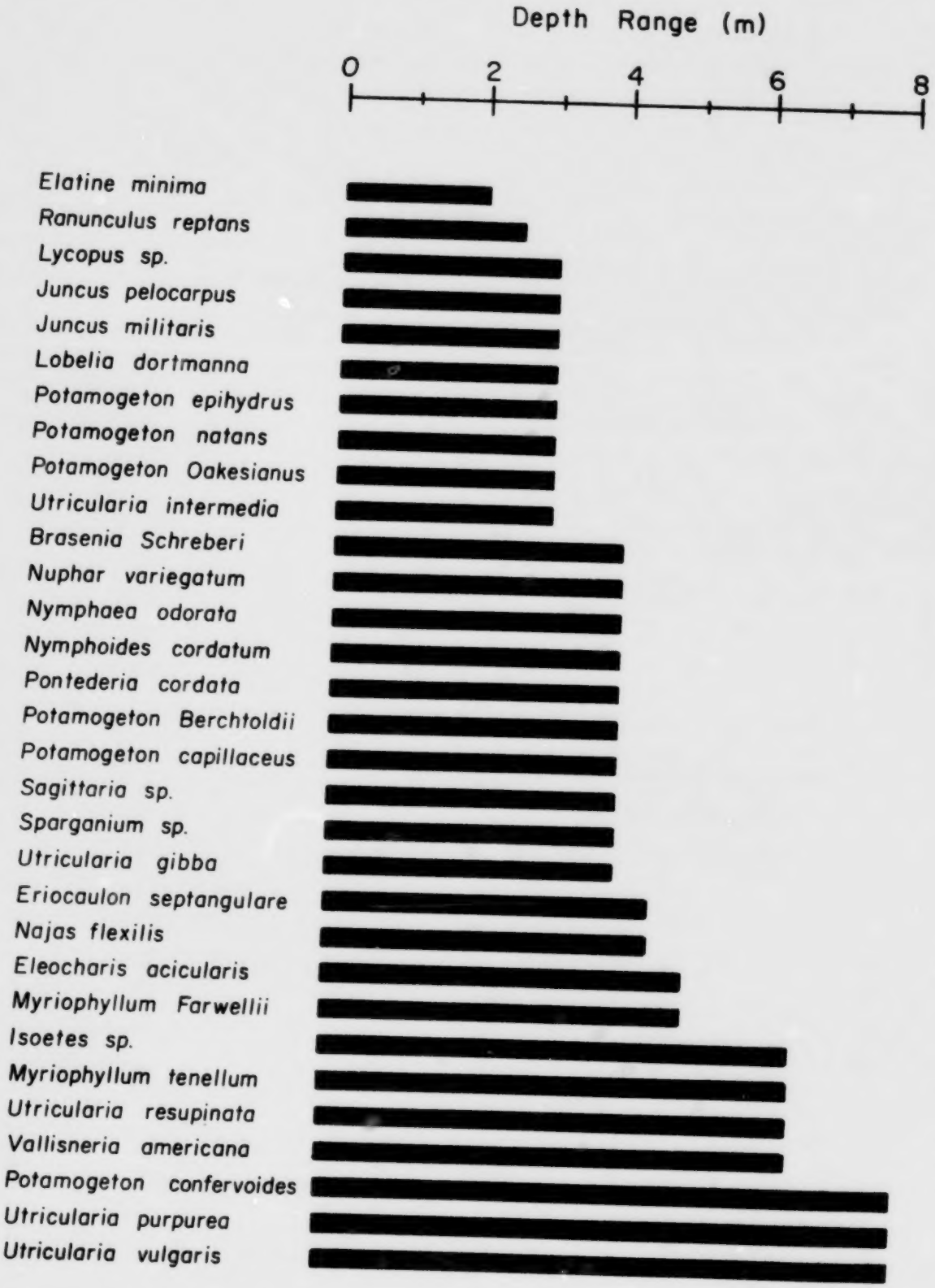
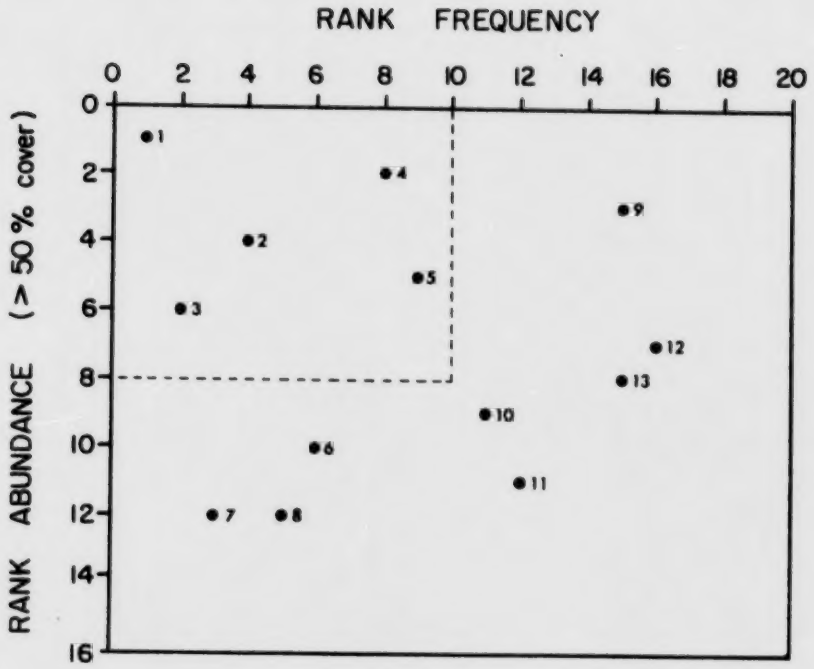

vascular species richness
40
30
20
10
2
4
6
8
10
12
14
16
18
31
number of transects

Figure 3

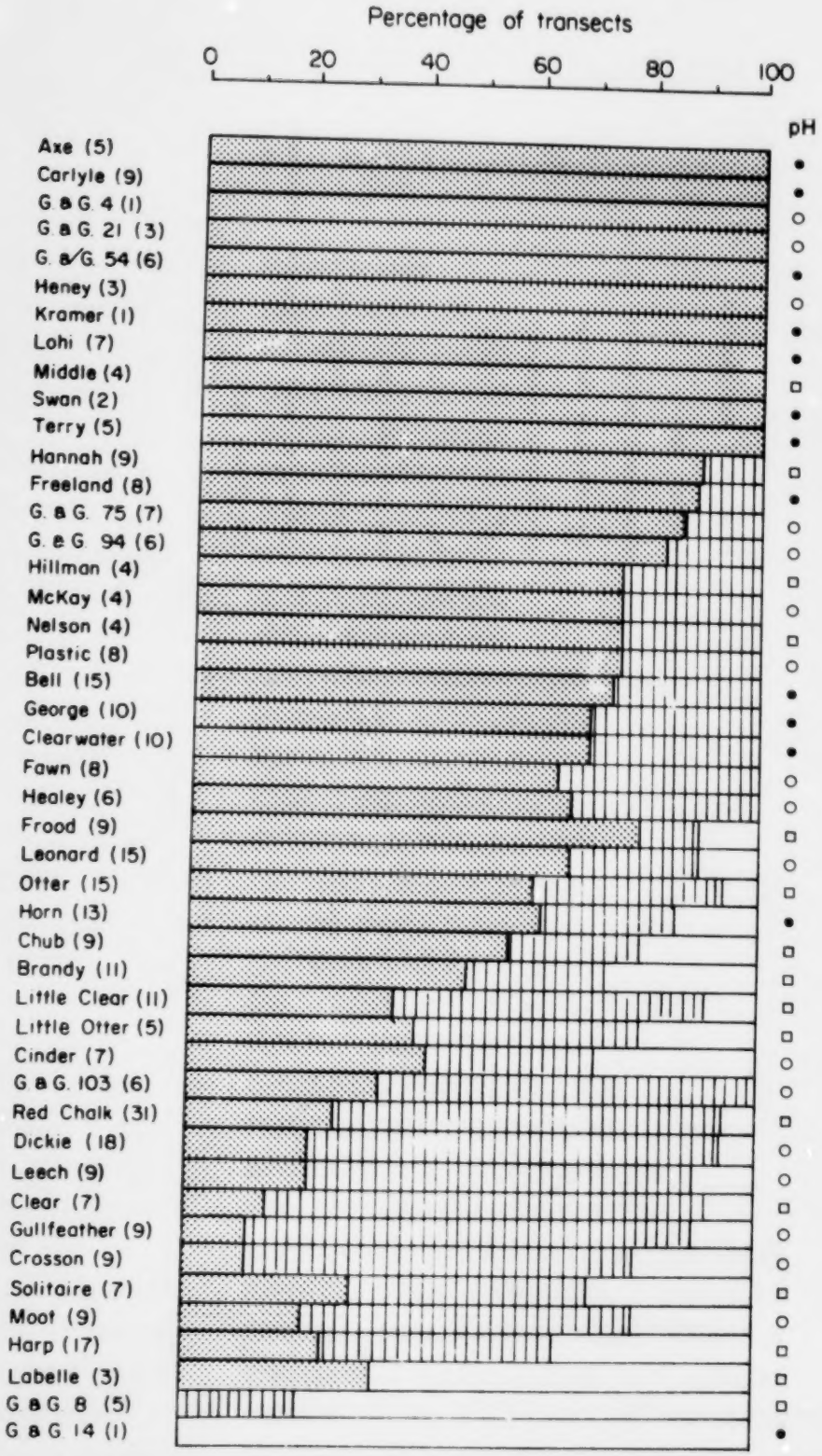

Depth Range (m)
0
2
4
6
8
Elatine minima
Ranunculus reptans
Lycopus sp.
Juncus pelocarpus
Juncus militaris
Lobelia dortmanna
Potamogeton epihydrus
Potamogeton natans
Potamogeton Oakesianus
Utricularia intermedia
Brasenia Schreberi
Nuphar variegatum
Nymphaea odorata
Nymphoides cordatum
Pontederia cordata
Potamogeton Berchtoldii
Potamogeton capillaceus
Sagittaria sp.
Sparganium sp.
Utricularia gibba
Eriocaulon septangulare
Najas flexilis
Eleocharis acicularis
Myriophyllum Farwellii
Isoetes sp.
Myriophyllum tenellum
Utricularia resupinata
Vallisneria americana
Potamogeton confervoides
Utricularia purpurea
Utricularia vulgaris



1 Eriocaulon septangulare
2 Isoetes spp.
3 Eleocharis acicularis
4 Myriophyllum tenellum
5 Utricularia purpurea
6 Utricularia vulgaris
7 Nuphar variegatum
8 Juncus pelocarpus
9 Potamogeton confervoides
10 Juncus militaris, Utricularia intermedia
11 Sagittaria spp.
12 Vallisneria americana
13 Nymphoides cordatum

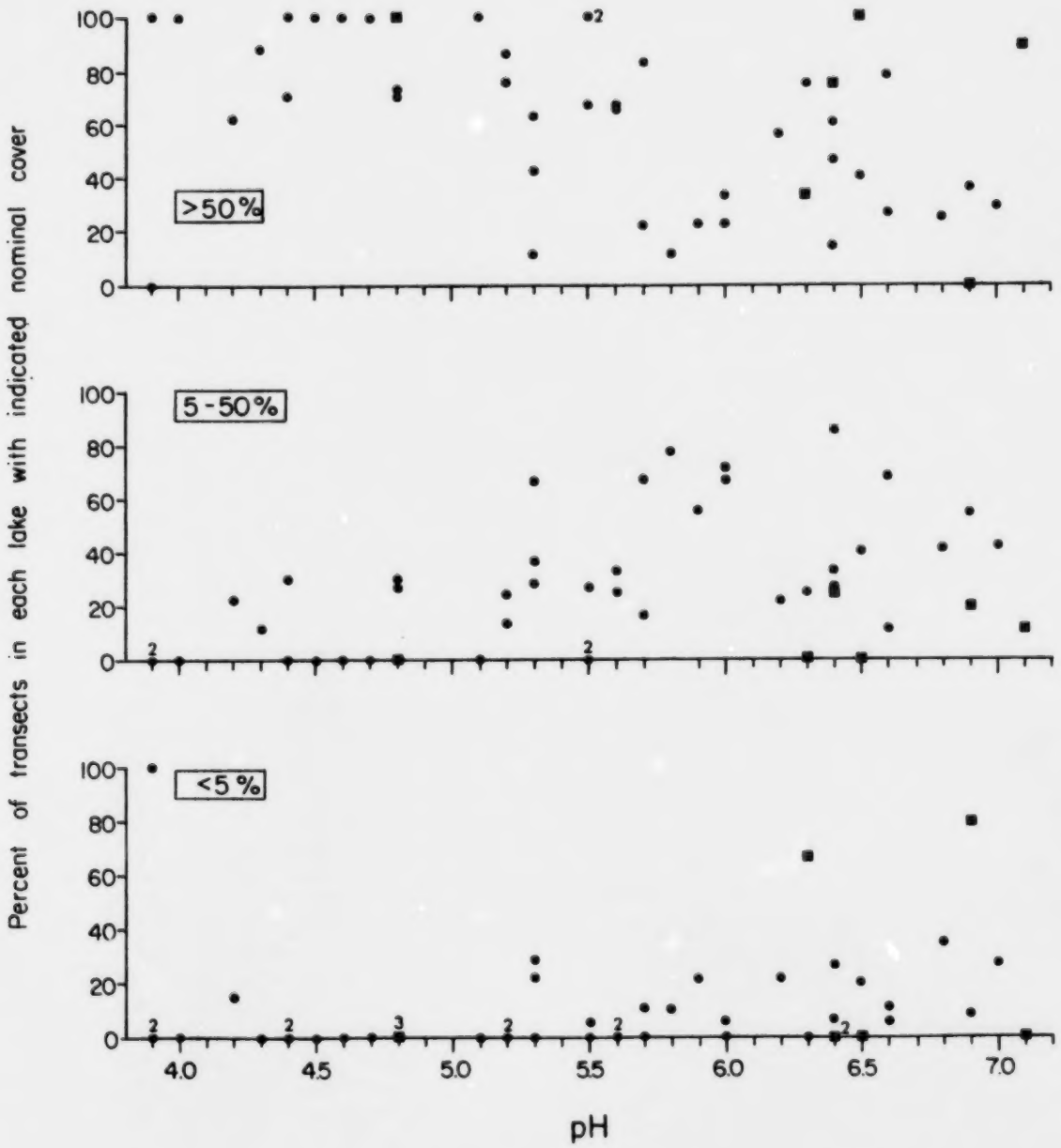
Figure 4

Figure 5



Percent of transects with maximum abundance of aquatic plants >50% (▩), 5-50% (▥) and <5% (▭).
pH intervals are indicated as pH <5 (•), 5-6 (○) and >6 (□).

Figure 6


Percent of transects in each lake with indicated nominal cover
>50%
5-50%
<5%
100
80
60
40
20
0
4.0
4.5
5.0
5.5
6.0
6.5
7.0
pH

APPENDIX - LIST OF TABLES

Tables A1-46: Macrophyte sampling dates, number of transects, number of occurrences of species on transects and individual and total bottom cover of species in the study lakes.

Table A1. Axe Lake
A2. Bell Lake
A3. Brandy Lake
A4. Carlyle Lake
A5. Chub Lake
A6. Cinder Lake
A7. Clear Lake
A8. Clearwater Lake
A9. Crosson Lake
A10. Dickie Lake
A11. Fawn Lake
A12. Freeland Lake
A13. Frood Lake
A14. George Lake
A15. Gorham & Gordon #4
A16. Gorham & Gordon #8 (Norway Lake)
A17. Gorham & Gordon #14
A18. Gorham & Gordon #21
A19. Gorham & Gordon #54 (Clara Belle Lake)
A20. Gorham & Gordon #75
A21. Gorham & Gordon #94
A22. Gorham & Gordon #103 (Downes Lake)
A23. Gullfeather Lake
A24. Hannah Lake
A25. Harp Lake
A26. Healey Lake
A27. Heney Lake
A28. Hillman Lake
A29. Horn Lake
A30. Kramer Lake
A31. Labelle Lake
A32. Leech Lake
A33. Leonard Lake
A34. Little Clear Lake
A35. Little Otter Lake
A36. Lohi Lake
A37. McKay Lake
A38. Middle Lake
A39. Moot Lake
A40. Nelson Lake
A41. Otter Lake
A42. Plastic Lake
A43. Red Chalk Lake
A44. Solitaire Lake
A45. Swan Lake
A46. Terry Lake

APPENDIX - LIST OF FIGURES

Figures A1-46: Transect location and additional information for the study lakes.

Figure A1. Axe Lake
A2. Bell Lake
A3. Brandy Lake
A4. Carlyle Lake
A5. Chub Lake
A6. Cinder Lake
A7. Clear Lake
A8. Clearwater Lake
A9. Crosson Lake
A10. Dickie Lake
A11. Fawn Lake
A12. Freeland Lake
A13. Frood Lake
A14. George Lake
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A16. Gorham & Gordon #8 (Norway Lake)
A17. Gorham & Gordon #14
A18. Gorham & Gordon #21
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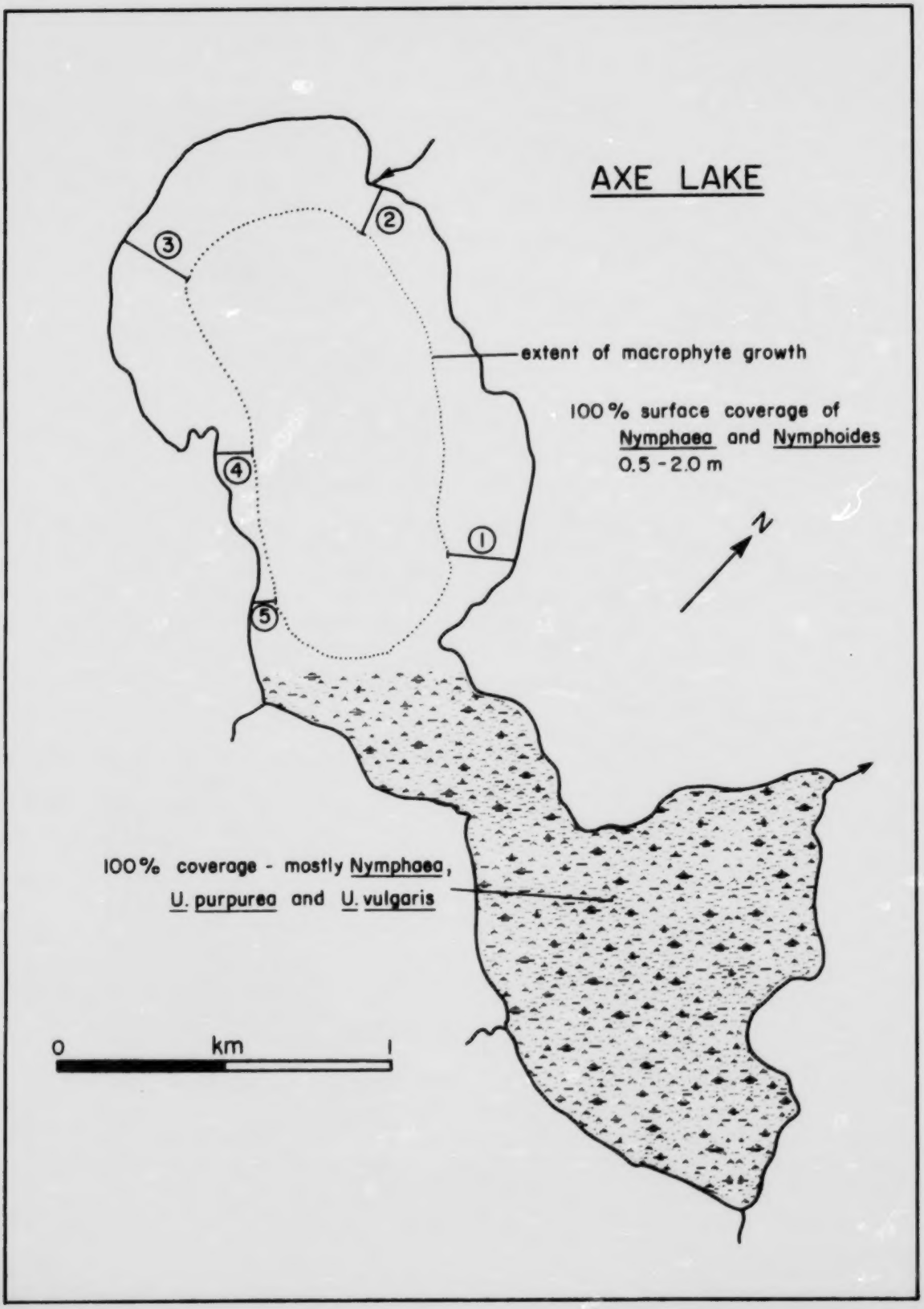
A20. Gorham & Gordon #75
A21. Gorham & Gordon #94
A22. Gorham & Gordon #103 (Downes Lake)
A23. Gullfeather Lake
A24. Hannah Lake
A25. Harp Lake
A26. Henley Lake
A27. Heney Lake
A28. Hillman Lake
A29. Horn Lake
A30. Kramer Lake
A31. Labelle Lake
A32. Leech Lake
A33. Leonard Lake
A34. Little Clear Lake
A35. Little Otter Lake
A36. Lohi Lake
A37. McKay Lake
A38. Middle Lake
A39. Moot Lake
A40. Nelson Lake
A41. Otter Lake
A42. Plastic Lake
A43. Red Chalk Lake
A44. Solitaire Lake
A45. Swan Lake
A46. Terry Lake

FIG. A-1


AXE LAKE
extent of macrophyte growth
100% surface coverage of Nymphaea and Nymphoides 0.5 - 2.0 m
N
100% coverage - mostly Nymphaea, U. purpurea and U. vulgaris
0
km
1
1
2
3
4
5

AXE LAKE
(Aug. 9/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1				2			3		4		5	
DEPTH ZONE (m)		0 0.2	0.2 0.5	0.5 1.0	1.0 2.0	0 0.4	0.4 0.6	0.6 2.0	0 0.6	0.6 2.5	0 0.5	0.5 2.5	0 0.5	0.5 3.0
TOTAL		*	*	o	*	*	*	*	*	*	*	*	*	*
Brasenia Schreberi	4				o		o	o	x	o			x	o
Eleocharis acicularis	1								x					
Eriocaulon septangulare	5	o	o					x	o	x	o		o	
Juncus pelocarpus	1								x					
Juncus militaris	5	o	o	o			o	o	x	o	x		o	
Lobelia Dortmanna	4	o	x						x		x		x	
Myriophyllum tenellum	3	x	o	x					x				x	
Nuphar variegatum	4					x	x	x	x		x		x	
Nymphaea odorata	5				o	o	o	o	o	o	o	x	o	o
Nymphoides cordatum	5	o	o	x	o	x	o	o	o	o	o	*	o	*
Pontederia cordata	2								x				x	
Potamogeton confervoides	3			x	x	x	o			o				
Potamogeton epihydrus	1					o								
Potamogeton natans	2					x					x			
Potamogeton Oakesianus	1					o	o							
Utricularia cornuta	4	o							x		x		x	
Utricularia gibba	1										x	x		
Utricularia intermedia	2					x			x					
Utricularia purpurea	5			x	o			x	x	o		x		x
Utricularia resupinata	3	o							o				o	
Utricularia vulgaris	5		x		x	x		x	x	x		x	x	x
Drepanocladus sp.	1								x					
Fontinalis antipyretica	5				x			x	x	x	*		x	x
Sphagnum cuspidatum	3				x			x	x	x				

Table A1

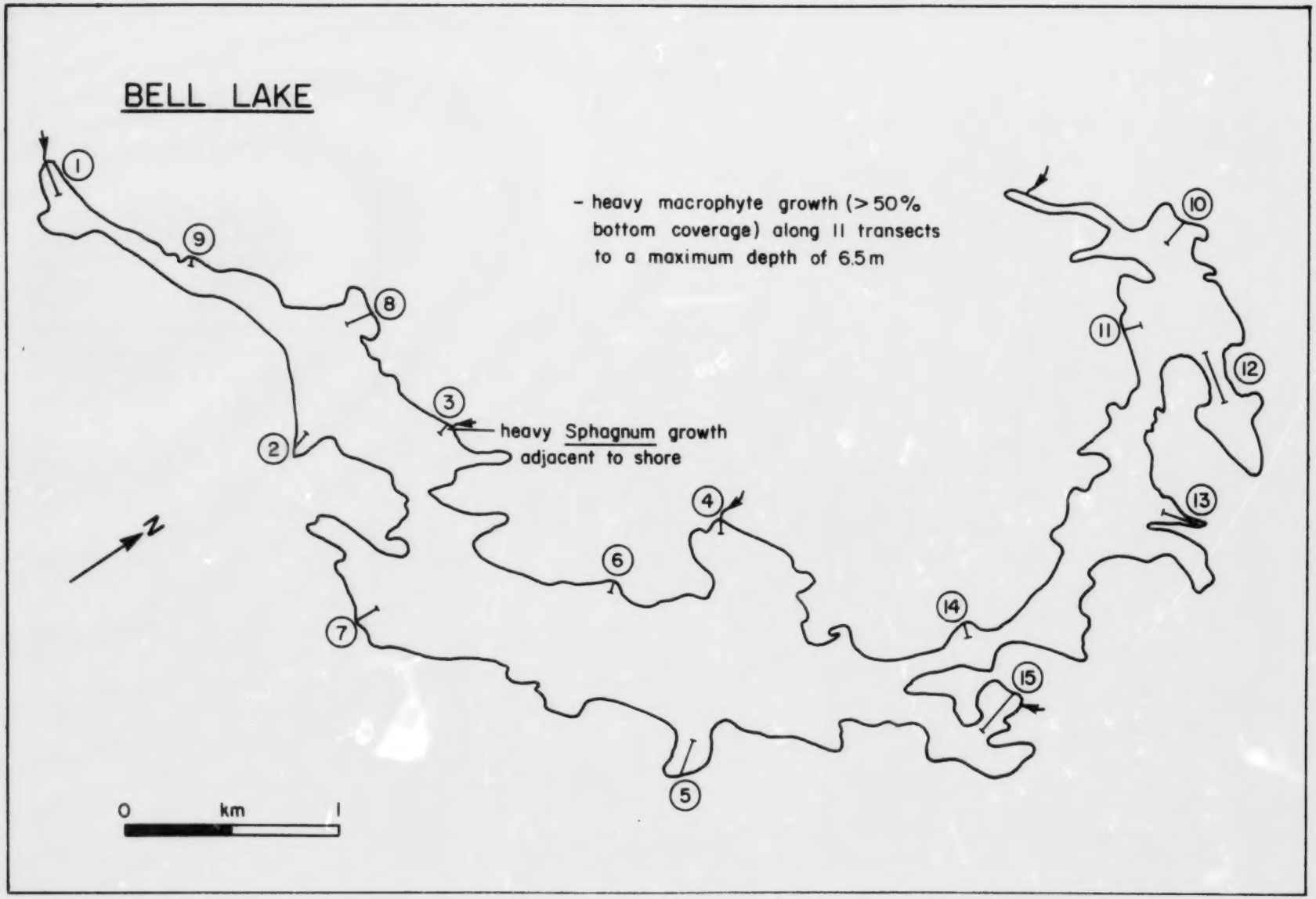

BELL LAKE
- heavy macrophyte growth (> 50% bottom coverage) along 11 transects to a maximum depth of 6.5 m
heavy Sphagnum growth adjacent to shore
N
0
km
1
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

FIG. A-2

BELL LAKE
(July 10/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1				2			3		4			5		
DEPTH		0	1.0	2.0	3.2	0	1.5	3.1	0	1.7	0	1.0	2.5	0	0.5	1.0
ZONE (m)		1.0	2.0	3.2	4.2	1.5	3.1	3.2	1.7	6.5	1.0	2.5	5.0	0.5	1.0	2.5
TOTAL		*	*	*	o	o	*	x	*	o	*	*	x	*	*	x
Brasenia Schreberi	8	x		x												
Eleocharis spp. (2)	10	x							x		x	x		o	o	
Eriocaulon septangulare	11	x				x	x		o		o			o	o	x
Isoetes sp.	13	*	o	o				x		x	o	o	x	o	o	x
Juncus pelocarpus	6								o					x	x	
Juncus militaris	8	x	o						x						x	
Lobelia Dortmanna	7					x			x		x					
Lycopus sp.	8	x	x				x		x							
Myriophyllum Farwellii	3		o													
Myriophyllum tenellum	8						o		x			o			o	
Nuphar variegatum	6	x														
Nymphaea odorata	11		x	x					x		x			x	x	
Nymphoides cordatum	5	x									x					
Pontederia cordata	13	x				x			x		x			x		
Potamageton Berchtoldii	1															
Potamogeton capillaceus	1	x														
Potamogeton confervoides	6		x						x	x	x			x	x	
Potamogeton epihydrus	3	x														
Potamogeton foliosus	3															
Potamogeton natans	2															
Sagittaria sp.	12	o	o			x	*		x		o	x		o	o	
Sparganium sp.	13	x	x	x					x		x	x		x	x	x
Utricularia purpurea	8		o	o						x						
Utricularia resupinata	2								o	x						
Utricularia vulgaris	13	x		x	o	x	x		o	x	o	o	x	x	x	x
Vallisneria americana	13															
Drepanocladus sp.	2								x							
Fontinalis sp.	6								o	o	x				x	
Gymnocolea inflata	2								x							
Sphagnum cuspidatum	7					x	x		x		x					
Sphagnum majus	1						x									
Sphagnum subsecundum platyphyllum	1								x							

Table A2

BELL LAKE (Cont'd)

TRANSECT		6	7		8				9				10	
DEPTH		0		2.0	0	1.0	1.7	2.2	0	1.6	2.0	3.0	0	2.0
ZONE (m)		4.5	2.0	3.0	1.0	1.7	2.2	4.0	1.6	2.0	3.0	3.8	2.0	4.0
TOTAL		o	o	x	*	*	*	o	*	x	*	o	*	*
Brasenia Schreberi	8					x							o	
Eleocharis spp. (2)	10	x	x						x		x		x	
Eriocaulon septangulare	11	x	o		o	x			o				o	
Isoetes sp.	13	x	x	x	x			o		x	*	x	x	o
Juncus pelocarpus	6		x			x			o	x				
Juncus militaris	8												o	x
Lobelia Dortmanna	7	x	x		o				o					
Lycopus sp.	8	x	x		x									
Myriophyllum Farwellii	3													
Myriophyllum tenellum	8	x			o	*	*		x	o				
Nuphar variegatum	6												x	
Nymphaea odorata	12		x		x								o	x
Nymphoides cordatum	5								x				x	
Pontederia cordata	13	x	x		x								o	
Potamageton Berchtoldii	1												x	
Potamogeton capillaceus	1													
Potamogeton confervoides	6							x						
Potamogeton epihydrus	2													
Potamogeton foliosus	2													
Potamogeton natans	2													
Sagittaria sp.	12		o		o	o			o	x				
Sparganium sp.	13		x		x				x				x	x
Utricularia purpurea	8												o	o
Utricularia resupinata	2													
Utricularia vulgaris	13	x	x		x	x	x		x					
Vallisneria americana	3												o	x
Drepanocladus sp.	2													
Fontinalis sp.	6				x								o	
Gymnocolea inflata	2				x									
Sphagnum cuspidatum	7	x			x					x				
Sphagnum majus	1													
Sphagnum subsecundum platyphyllum	1		x											

BELL LAKE (Cont'd)

TRANSECT		11		12				13			14		15		
DEPTH ZONE (m)		0 2.0	2.0 4.5	0 1.0	1.0 1.5	1.5 3.0	3.0 4.0	0 1.0	1.0 2.0	2.0 4.0	0 1.0	1.0 3.0	0 0.5	0.5 2.0	2.0 4.0
TOTAL		o	o	*	*	o	x	*	*	o	o	o	*	*	*
Brasenia Schreberi	8	x		o				o	x		x		o	x	
Eleocharis spp. (2)	10	x									x				
Eriocaulon septangulare	11										x				
Isoetes sp.	13	x	o		x	o					o	o			
Juncus pelocarpus	6	x													
Juncus militaris	8	x		o	o			o	x				o	o	
Lobelia Dortmanna	7														
Lycopus sp.	8	x									x				
Myriophyllum Farwellii	3			o									o	o	
Myriophyllum tenellum	8	x													
Nuphar variegatum	6	x		x				x					o	x	
Nymphaea odorata	12	x		o	x			o	x		x		o		
Nymphoides cordatum	5			x	o										
Pontederia cordata	13	x		o				o			x				
Potamageton Berchtoldii	1														
Potamogeton capillaceus	1														
Potamogeton confervoides	6														o
Potamogeton epihydrus	3	x							x						
Potamogeton foliosus	3	x		o		x					x				
Potamogeton natans	2			x											
Sagittaria sp.	12	o			*			x			o		x		
Sparganium sp.	13	x	o	o	x	x		o	x	o	o	x	o		o
Utricularia purpurea	8	o	o	x	o	o	x	x	*	o		x	x		
Utricularia resupinata	2														
Utricularia vulgaris	13			o						x	x				o
Vallisneria americana	3			o		x			x	x					
Drepanocladus sp.	2												o	*	*
Fontinalis sp.	6						x								
Gymnocolea inflata	2														
Sphagnum cuspidatum	7	x	x												
Sphagnum majus	1														
Sphagnum subsecundum platyphyllum	1														

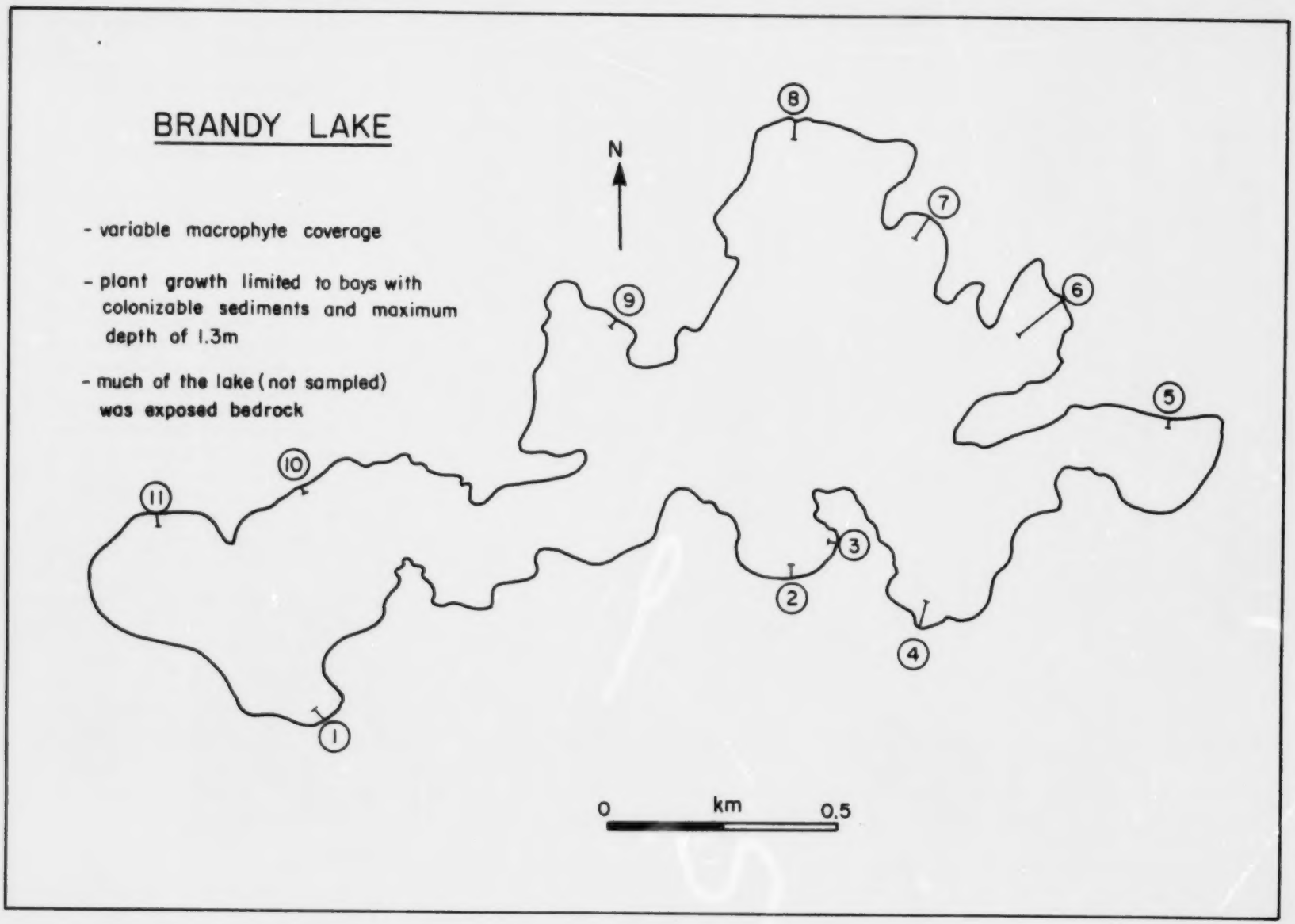

BRANDY LAKE
- variable macrophyte coverage
- plant growth limited to bays with colonizable sediments and maximum depth of 1.3m
- much of the lake (not sampled) was exposed bedrock
N
8
7
6
5
9
10
11
3
2
4
1
0
km
0.5

FIG. A-3

BRANDY LAKE
(Aug. 10/78)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1	2	3	4	5	6	7		8	9	10	11
DEPTH		0	1.0	0	0	0	0	0	0.9	0	0	0	0
ZONE (m)		1.2	1.1	1.2	1.2	1.0	1.2	0.9	1.2	1.0	1.0	1.3	1.0
TOTAL		o	x	o	*	x	*	*	*	*	o	x	*
Brasenia Schreberi	5			x	x		x	x		x			
Elatine minima	2				x					x			
Eleocharis acicularis	2	x											x
Eriocaulon septangulare	3				x					o			o
Isoetes sp.	3				o					x			o
Juncus pelocarpus	1												x
Najas flexilis	6	x		x	x		x	o					o
Nymphaea odorata	9	x		o	o	x	x	o		o	o		o
Nuphar variegatum	3	x			o		o						
Pontederia cordata	10	x	x	x	x		o	x		x	x	x	x
Potamogeton epihydrus	4	x						x		x			x
Sagittaria sp.	3				o					o			o
Utricularia resupinata	1												x
Vallisneria americana	1	o											
Nitella flexilis	3			x			o	x	*				
Nitella tenuissima	1											x	
Fontinalis antipyretica	6			x	x	x					x	x	x
Hygroamblystegium sp.	1							x					

Table A3

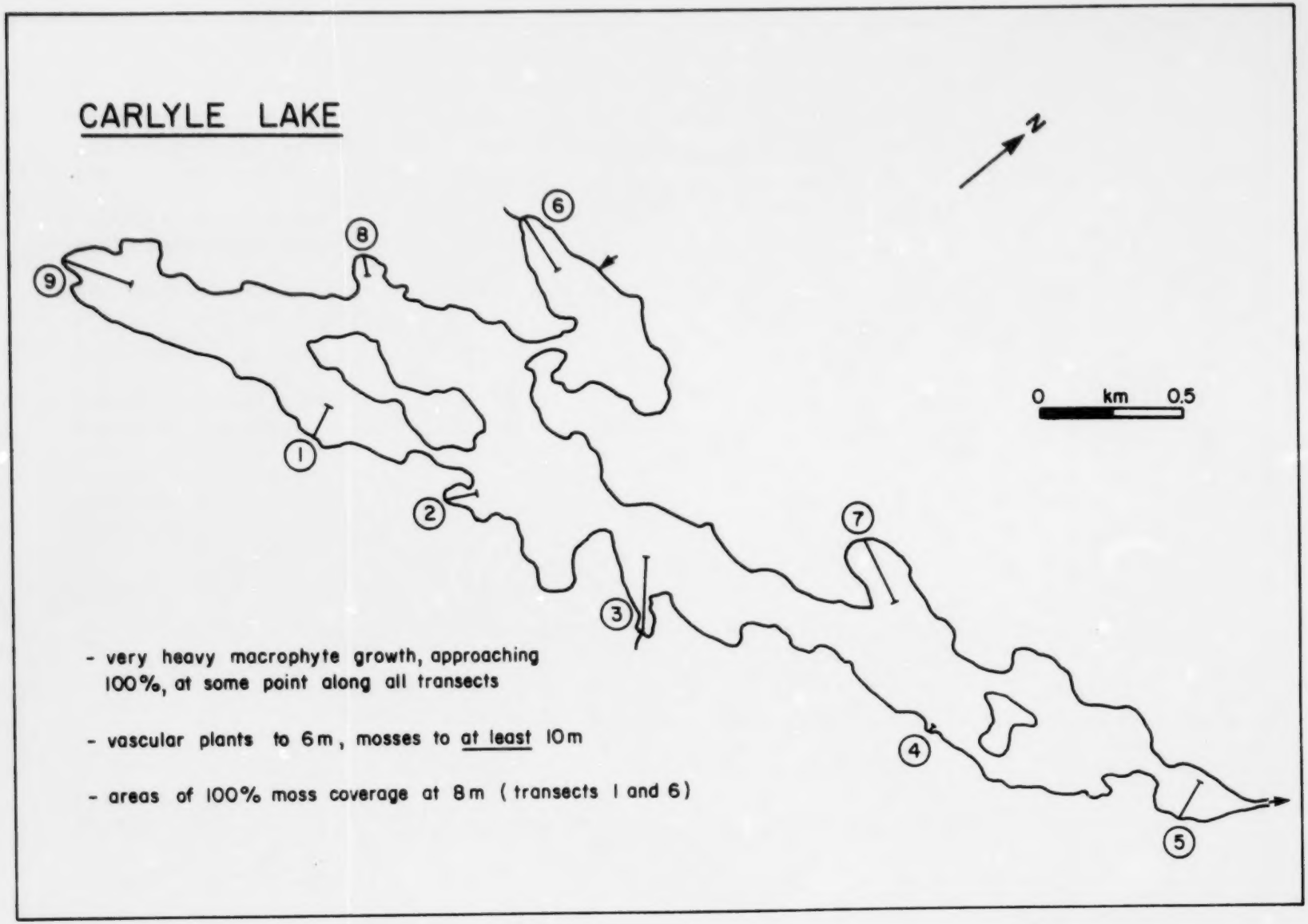

CARLYLE LAKE
N
0 km 0.5
1
2
3
4
5
6
7
8
9
- very heavy macrophyte growth, approaching 100%, at some point along all transects
- vascular plants to 6 m, mosses to at least 10 m
- areas of 100% moss coverage at 8 m (transects 1 and 6)

FIG. A-4

CARLYLE LAKE
(July 12/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1				2				3					4			
DEPTH		0	1.5	4.0	8.0	0	1.3	1.7	3.0	0	1.0	1.6	3.5	4.5	0	1.6	2.8	3.7
ZONE (m)		1.5	4.0	8.0	12.	1.3	1.7	3.0	7.0	1.0	1.6	3.5	4.5	6.5	1.6	2.8	3.7	4.5
TOTAL		o	o	o	*	*	*	o	o	*	*	*	*	o	*	o	*	x
Brasenia Schreberi	1																	
Elatine minima	6					x	x			x								
Eleocharis spp. (2)	7					x	o	x		o								
Eriocaulon septangulare	9	o				o	o			o					o			
Isoetes sp.	9		o			o		o		o			o		x	o	*	x
Juncus pelocarpus	6					x	*											
Juncus militaris	2																	
Lobelia Dortmanna	6					x				x								
Lycopus sp.	5					x				x								
Myriophyllum Farwellii	1																	
Myriophyllum tenellum	8						x	x				o	o			o		
Nuphar variegatum	2									x								
Nymphaea odorata	4																	
Nymphoides cordatum	1																	
Pontederia cordata	7					x				x					x			
Potamogeton confervoides	8					x				x		x			o	o	x	
Potamogeton epiphydrus	1									x								
Ranunculus reptans	1																	
Sagittaria sp.	7					o				o	o				x			
Sparganium sp.	7					x		x		x		x				x		
Utricularia purpurea	5										o	o	o			o	o	x
Utricularia resupinata	5					x	x											
Utricularia vulgaris	9	x	o	x		x	x	o	x	o	x				o			
Fontinalis sp.	6								x	o	o	o			x			
Drepanocladus exannulatus	5				*	x		x	x	x	o	o	o	o				
Sphagnum cuspidatum	2									x								
Sphagnum pylaesii	7		x	o	o		x		o		o		o	o	o	o		
Sphagnum recurvum amblyphyllum	1																	
Sphagnum subsecundum contortum	2		x			x												

Table A4

CARLYLE LAKE (Cont'd.)

	TRANSECT	5		6				7				8			9			
	DEPTH	0	1.0	0	1.3	2.0	5.0	0	2.0	3.5	5.5	0	1.2	2.0	0	0.7	2.0	3.0
	ZONE (m)	1.0	1.5	1.3	2.0	5.0	8.0	2.0	3.5	5.5	7.0	1.2	2.0	3.0	0.7	2.0	3.0	8.0
	TOTAL	*	*	*	*	o	*	*	*	o	x	*	*	o	*	*	x	x
Brasenia Schreberi	1			o	x													
Elatine minima	6			x				x				x	x		x	x		
Eleocharis spp. (2)	7		x	o	x			x				x	x		x			
Eriocaulon septangulare	9	o		*	o			*	x			*	o		*	x		
Isoetes sp.	9			o		o		x		x		o		x	o	x	x	
Juncus pelocarpus	6	o			o			x				x	o		o	*		
Juncus militaris	2	x							x									
Lobelia Dortmanna	6			x				o				o			x			
Lycopus sp.	5			x	x							x			x	x		
Myriophyllum Farwellii	1	x	o															
Myriophyllum tenellum	8	o	o		o	o		o	o					o	x			
Nuphar variegatum	2			x														
Nymphaea odorata	4				x			x				x			x			
Nymphoides cordatum	1	o	o															
Pontederia cordata	7	x		x				x				x						
Potamogeton confervoides	8	o	o	x	x	o		x	x				o				x	
Potamogeton epiphydrus	1																	
Ranunculus reptans	1												x					
Sagittaria sp.	7	x	o	o	o							x			x			
Sparganium sp.	7	x		x	x								x		x	x	x	
Utricularia purpurea	5	o	*					x	o	o			x					
Utricularia resupinata	5	o		x	o				x						x	o		
Utricularia vulgaris	9	o		o	o	o		x	x			x	x	o	x	x		
Fontinalis sp.	6			x	x	x	*	x	x	x		x						
Drepanocladus exannulatus	5			x			o									x	x	x
Sphagnum cuspidatum	2			x														
Sphagnum pylaesii	7						o				x	x			x			
Sphagnum recurvum amblyphyllum	1																	x
Sphagnum subsecundum contortum	2																	

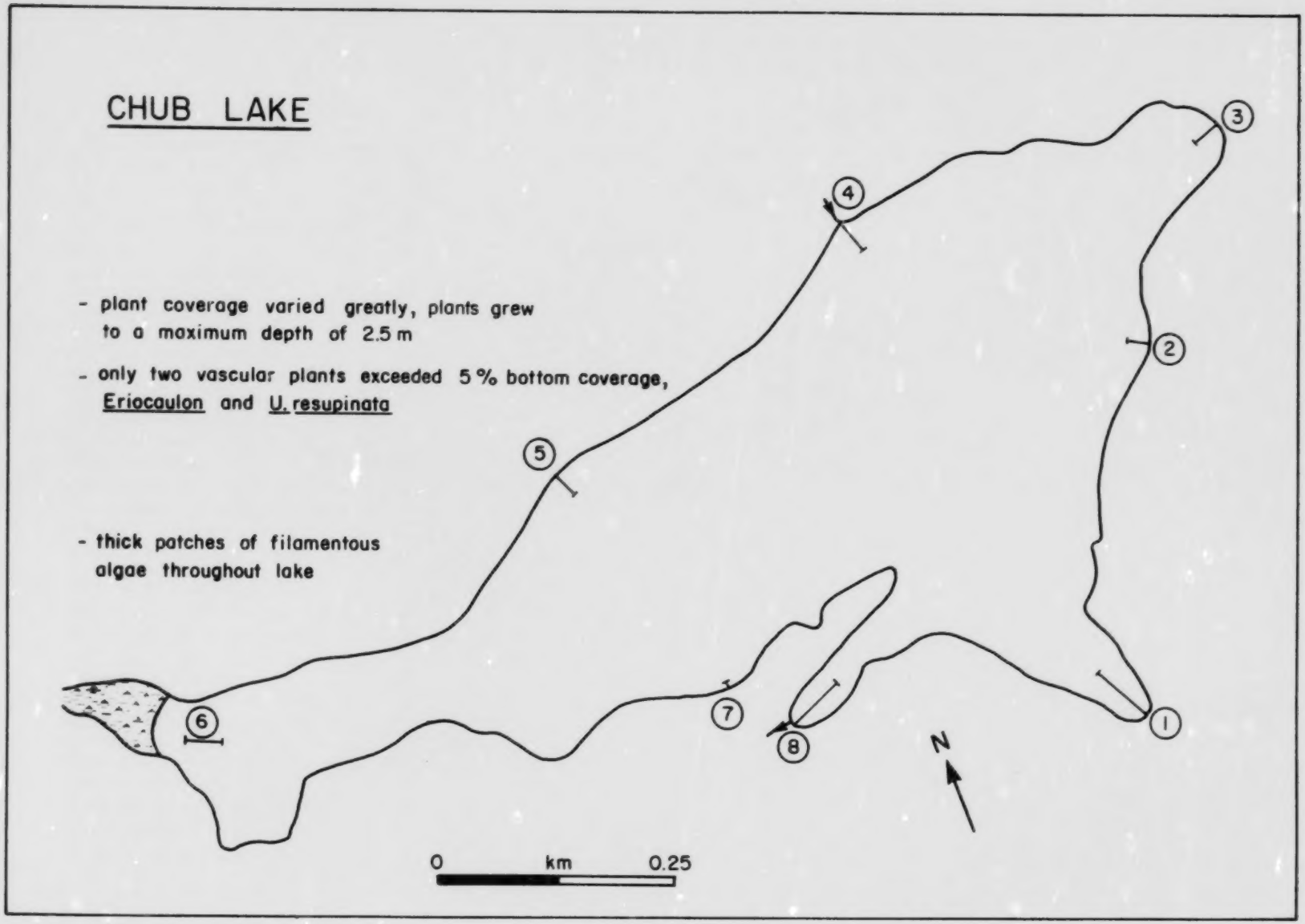

CHUB LAKE
- plant coverage varied greatly, plants grew to a maximum depth of 2.5 m
- only two vascular plants exceeded 5 % bottom coverage, Eriocaulon and U. resupinata
- thick patches of filamentous algae throughout lake
1
2
3
4
5
6
7
8
N
0
km
0.25

FIG. A-5

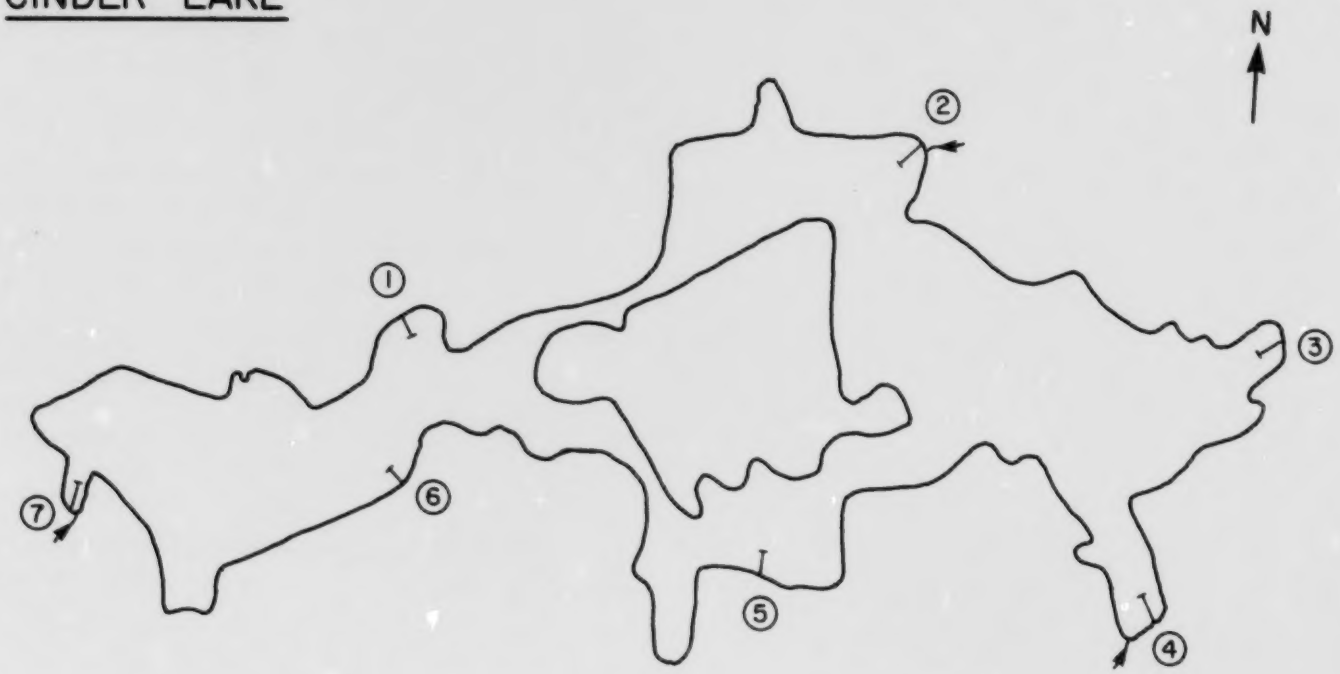
CHUB LAKE
(July 30/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

		TRANSECT	1		2		3		4		5		6	7	8		9		
		DEPTH	0	0.5	0	0.5	0	1.2	0	0.5	0	0.5	0	0	0	0.3	0	0.5	0.7
		ZONE (m)	0.5	1.5	0.5	1.5	1.2	1.5	0.5	2.5	0.5	2.0	1.5	0.5	0.3	2.0	0.5	0.7	1.5
		TOTAL	x	*	*	x	*	o	o	o	x	x	x	o	*	x	*	o	x
Brasenia Schreberi	8		x				x		x		x		x	x	x	x	x		
Eriocaulon septangulare	9		x	x	*	x	*		o		x		x	o	o	x	*	o	
Isoetes sp.	6			x	x	x	x		x							x			x
Lobelia Dortmanna	3				x		x				x								
Lycopus sp.	2						x		x										
Nuphar variegatum	1		x																
Nymphaea odorata	4		x		x								x		x				
Nymphoides cordatum	1												x						
Pontederia cordata	8		x	x	x		x		x		x		x	x	x	x			
Potamogeton Berchtoldii	1								x										
Potamogeton epihydrus	3						x		x				x						
Potamogeton Oakesianus	1														x				
Sparganium sp.	2								x				x						
Utricularia purpurea	2						x						x						
Utricularia resupinata	4			*				o							o	x	o	o	
Nitella tenuissima	1												x						
Fontinalis antipyretica	5				x		x		o	o	x	x			o				
Sphagnum sp.	1						x												

Table A5

CINDER LAKE



- variable macrophyte growth throughout the lake to a maximum depth of 4 m

- Fontinalis was dominant

0 km 0.5

-not drawn to scale

FIG. A-6

CINDER LAKE (June 7/79) Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1	2	3		4	5	6	7
DEPTH ZONE (m)		0 4.0	0 0.6	0 2.0	2.0 4.0	0 2.0	0 3.0	0 3.2	0 3.0
TOTAL		*	x	x	o	x	*	*	o
Brasenia Schreberi	2	x							x
Eriocaulon septangulare	1			x					
Juncus militaris	1							x	
Lycopus sp.	1					x			
Myriophyllum heterophyllum	3						x	o	o
Nuphar variegatum	3	x						x	x
Nymphaea odorata	6	x	x	x		x	x		x
Pontederia cordata	6	x	x	x		x		x	x
Potamogeton natana	1							x	
Sparganium sp.	4		x			x		x	x
Utricularia purpurea	7	o	x	x		x	o	x	x
Utricularia vulgaris	3							x	x
Fontinalis antipyretica	6	*		x	o	x	*	o	o
Sphagnum fimbriatum	1					x			
Sphagnum subsecundum contortum	1					x			
Sphagnum subsecundum inundatum	1					x			

Table A6

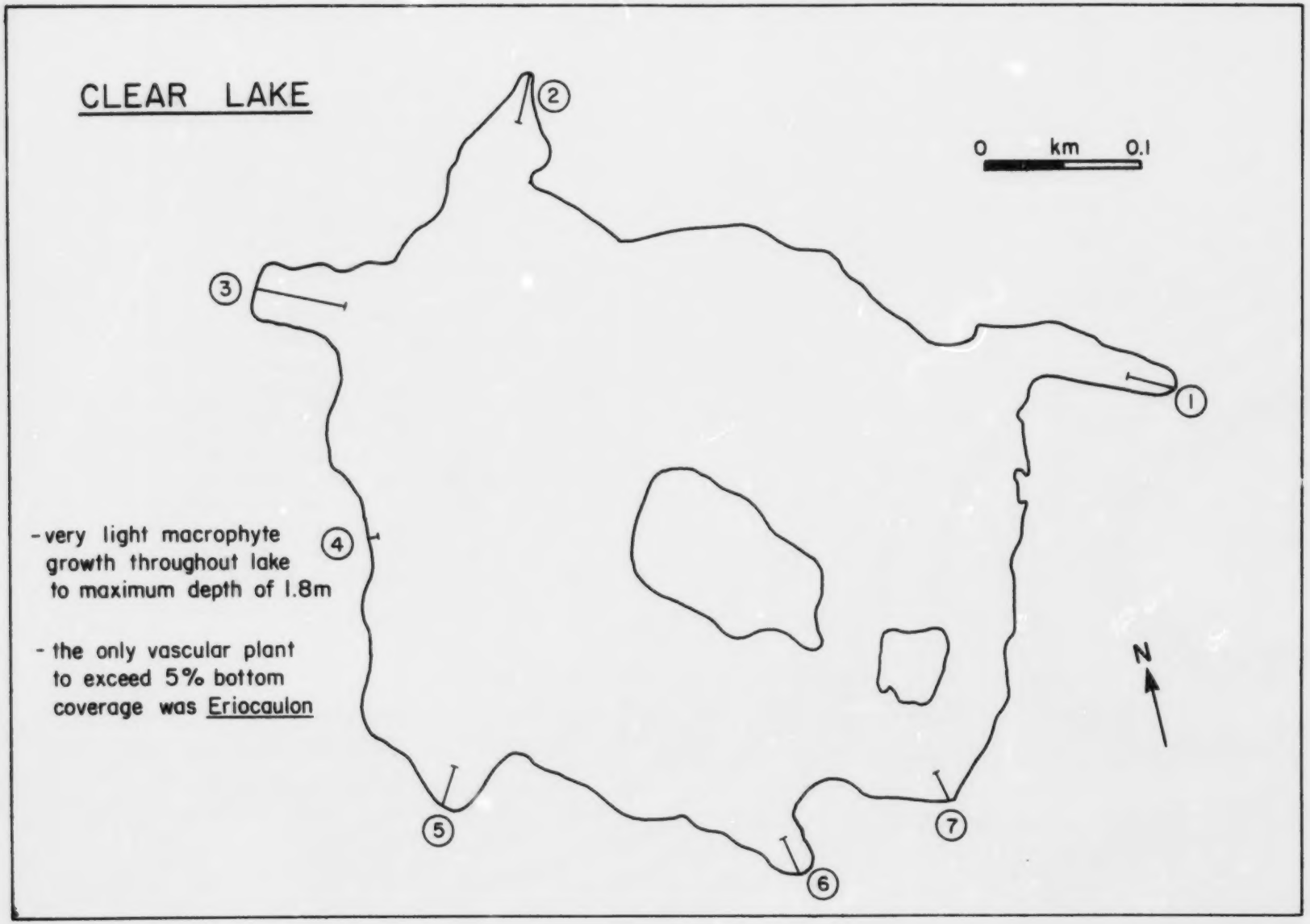

CLEAR LAKE
0 km 0.1
- very light macrophyte growth throughout lake to maximum depth of 1.8m
- the only vascular plant to exceed 5% bottom coverage was Eriocaulon
N
1
2
3
4
5
6
7

FIG. A-7

CLEAR LAKE (June 21/79) Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1		2		3		4	5	6	7
DEPTH		0	0.7	0	0.7	0	0.5	0	0	0	0
ZONE (m)		0.7	1.5	0.7	1.5	0.5	1.8	1.0	1.6	1.8	1.8
TOTAL		o	x	*	x	o	x	o	o	o	o
Brasenia Schreberi	1					x					
Elatine minima	1			x							
Eleocharis acicularis	2			x		x					
Eriocaulon septangulare	7	o	x	o	x	o	x	o	o	o	o
Isoetes sp.	4		x	x		x					x
Juncus pelocarpus	2	x				x	x				
Labelia Dortmanna	5	x		x		x		x			x
Nuphar variegatum	3	x		x							x
Pontederia cordata	3			x		x					x
Potamogeton natans	1			x							
Sparganium sp.	1									x	
Utricularia resupinata	2	x	x				x				
Fontinalis antipyretica	5	x		o	x	x	x			x	x
Sphagnum cuspidatum	1					x					
Sphagnum palustre	1					x					
Sphagnum subsecundum platyphyllum	1			x							

Table A7

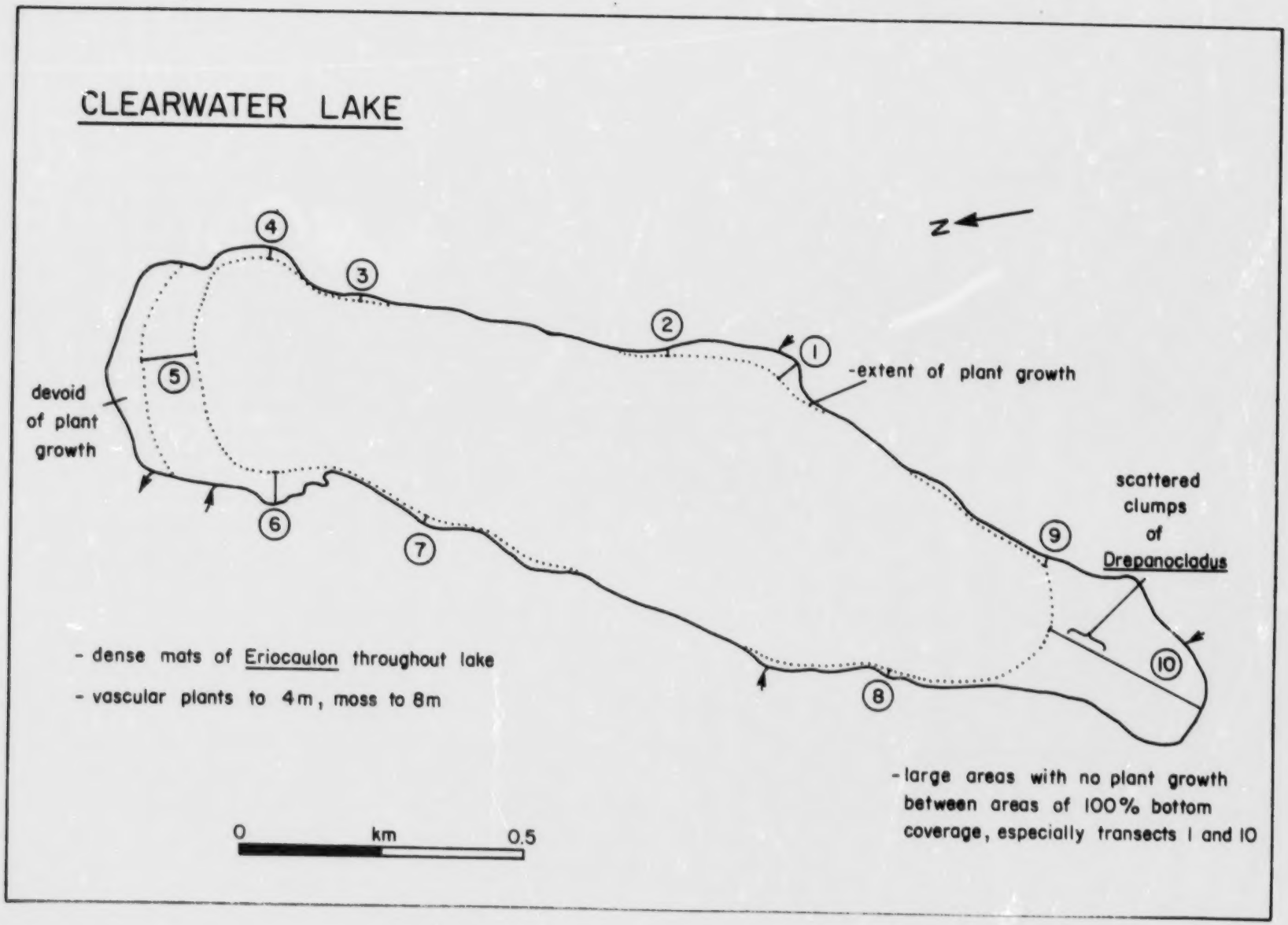

CLEARWATER LAKE
N
4
3
2
1
5
6
7
8
9
10
devoid of plant growth
-extent of plant growth
scattered clumps of Drepanocladus
- dense mats of Eriocaulon throughout lake
- vascular plants to 4m, moss to 8m
- large areas with no plant growth between areas of 100% bottom coverage, especially transects 1 and 10
0
km
0.5

FIG. A-8

CLEARWATER LAKE
(May 23/78)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1		2	3	4	5			6		7	8	9		10		
DEPTH		0	1.0	1.0	0.5	0.5	1.3	2.3	3.8	0	2.7	0	0	0.5	2.5	0	1.0	2.5
ZONE (m)		1.0	4.0	2.5	2.0	1.5	2.3	3.8	6.0	2.7	6.0	1.5	2.5	2.0	4.0	1.0	2.5	8.0
TOTAL		*	x	*	o	o	*	o	o	*	x	o	*	*	x	*	*	x
Eleocharis acicularis	4	x					x					x				*	o	
Eriocaulon septangulare	10	*	x	*	o	o	*	o		*		o	*	*			*	
Juncus pelocarpus	2							x								x		
Lycopus sp.	1															x		
Myriophyllum tenellum	3		x					o						o				
Utricularia vulgaris	1	x																
Cladopodiella fluitans	2						o					o						
Drepanocladus exannulatus	6	x	x					o	o	o	x		x	o	x		x	x

Table A8

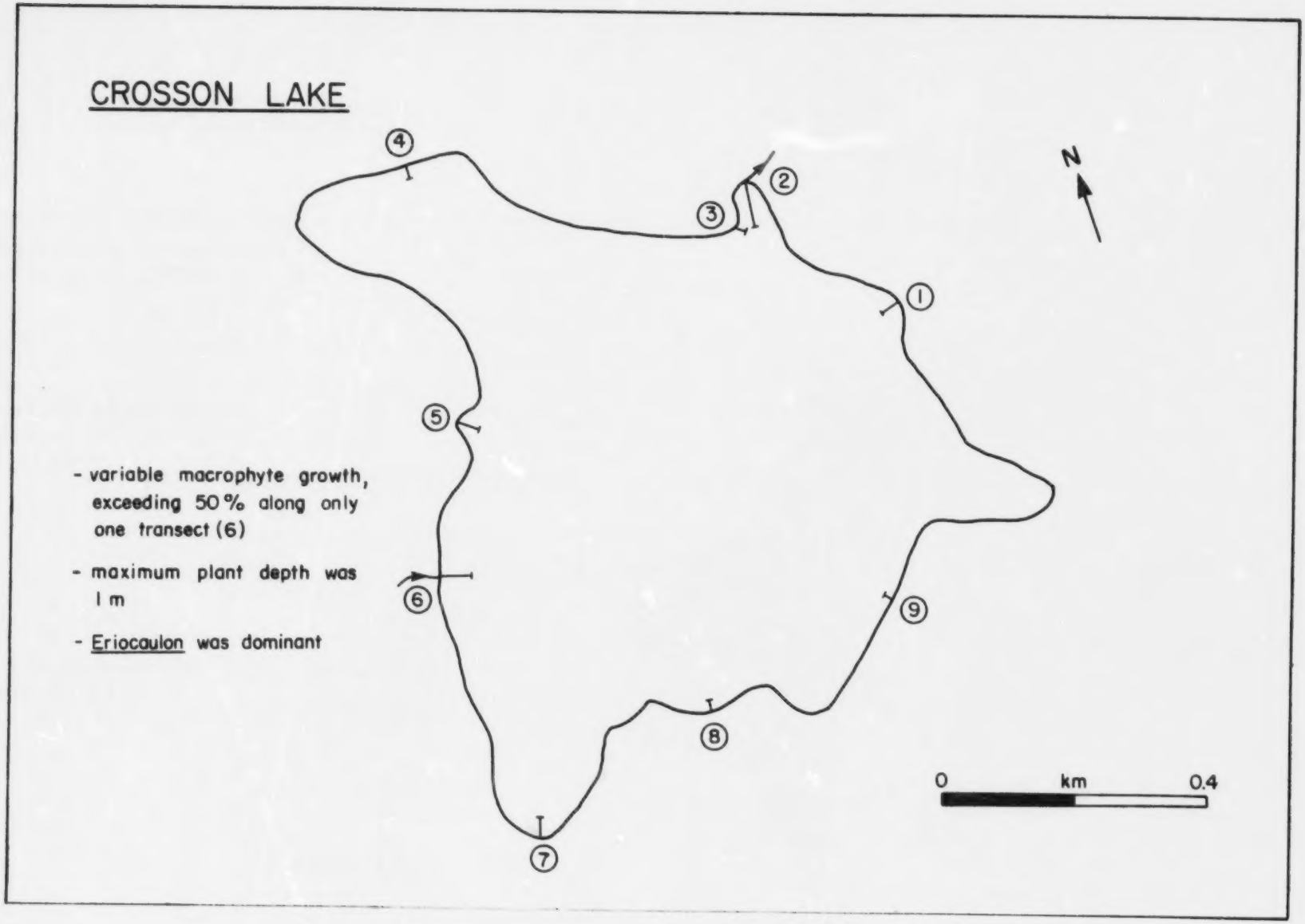

CROSSON LAKE
- variable macrophyte growth, exceeding 50% along only one transect (6)
- maximum plant depth was 1 m
- Eriocaulon was dominant
N
0
km
0.4

FIG. A-9

CROSSON LAKE
(June 5/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1		2		3		4	5	6			7		8	9
DEPTH		0	0.6	0	0.5	0	1.0	0	0	0	0.8	1.0	0.5	1.2	0	0
ZONE (m)		0.6	1.2	0.5	2.0	1.0	2.0	1.7	2.0	0.8	1.0	2.0	1.2	1.5	1.0	1.0
	TOTAL	o	x	x	x	o	x	o	x	*	o	*	o	x	o	o
Brasenia Schreberi	3					x							x		x	
Eleocharis spp. (2)	1											x				
Eriocaulon septangulare	7		x			o	x	o			x	x	o	x	o	o
Isoetes sp.	3							x				x		x		
Juncus militaris	1														x	
Lobelia Dortmanna	3							o					x		x	
Lycopus sp.	3							x		x	x	x				x
Nuphar variegatum	3							x	x	x	x					
Nymphaea odorata	1									x		x				
Pontederia cordata	7		x	x		x		x	x	o	x	x				x
Potamogeton epihydrus	1									o						
Potamogeton natans	2					x				x	o					
Sparganium sp.	2									x	x		x			
Utricularia purpurea	1											x				
Utricularia resupinata	1														x	
Utricularia vulgaris	2				x					x	x	x				
Fontinalis antipyretica	4									x	x	o	x	x	x	x
Fontinalis hypnoides duriaei	2	o	x			x	x									

Table A9

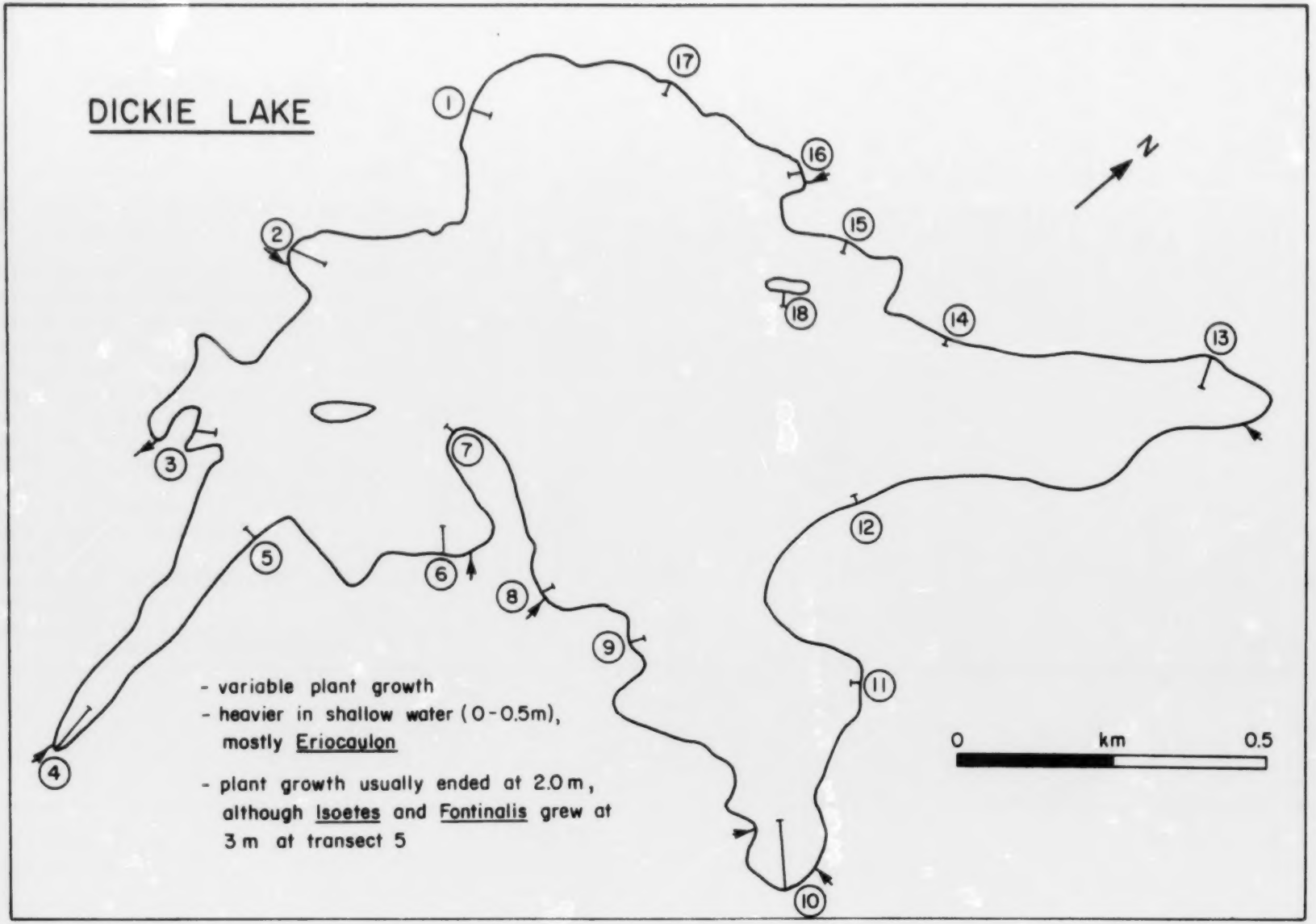

DICKIE LAKE
N
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
- variable plant growth
- heavier in shallow water (0-0.5m), mostly Eriocaulon
- plant growth usually ended at 2.0 m, although Isoetes and Fontinalis grew at 3 m at transect 5
0
km
0.5

FIG. A-10

DICKIE LAKE
(Aug. 2/78)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1		2		3		4	5		6		7		8	
DEPTH ZONE (m)		0 0.5	1.0 1.5	0 0.5	1.0 1.5	0 1.0	1.0 1.5	0 1.5	0 0.5	0.5 3.0	0 0.5	0.5 1.5	0 0.5	0.5 1.5	0 0.5	0.5 1.5
TOTAL		o	x	o	o	o	x	x	*	x	o	x	o	o	o	x
Brasenia Schreberi	1			x												
Elatine minima	4														x	
Eleocharis acicularis	5								o							
Eriocaulon septangulare	18	o		o		x		x	o		o		o		o	
Isoetes sp.	14	x					x		x	x				o		x
Juncus militaris	1	x														
Juncus pelocarpus	9	x									x		x		x	
Lobelia Dortmanna	13	x									x		x		x	
Lycopus sp.	7	x									x					
Myriophyllum tenellum	5														x	
Nuphar variegatum	1															
Nymphaea odorata	13	x	x	o	o	o		x	o		x	x				
Pontederia cordata	18	x	x	x		x		x	x		x		x		x	
Potamogeton epihydrus	2								x							
Sparganium sp.	1								x							
Utricularia purpurea	2															
Utricularia resupinata	6														o	
Utricularia vulgaris	1															
Fontinalis antipyretica	16			o		x	x	x	x	x			o	o	x	x

Table A10

DICKIE LAKE (Cont'd.)
(Aug. 2/78)

TRANSECT		9		10		11		12		13		14	15	16		17	18	
DEPTH ZONE (m)		0 0.5	0.5 1.5	0 0.5	0.5 2.0	0 0.5	1.0 2.0	0 0.5	0.5 2.0	0 0.7	0.7 1.5	0 2.0	0 1.5	0 0.7	0.7 1.7	0 1.5	0 0.5	0.5 2.0
TOTAL		o	x	*	o	*	o	o	o	*	o	o	o	o	x	o	o	
Brasenia Schreberi	1																	
Elatine minima	4					x								x			x	
Eleocharis acicularis	5					x				x		x		x				
Eriocaulon septangulare	18	o		o		o		x		x		o	x	x		x	o	
Isoetes sp.	14	x	x				o	x	o		x	x	x		x	x		x
Juncus militaris	1																	
Juncus pelocarpus	9					x		x		x		x	x					
Lobelia Dortmanna	13	x		x		x				x		x	x	x		x	x	
Lycopus sp.	7			x	x	x				x		x			x			
Myriophyllum tenellum	5	x		x		x				o	o							
Nuphar variegatum	1													x				
Nymphaea odorata	13	x		o	o	x				o	x			x	x	x	x	
Pontederia cordata	18	x		x		x		x		x		x	x	x	x	x	x	
Potamogeton epihydrus	2													x				
Sparganium sp.	1																	
Utricularia purpurea	2				x						x							
Utricularia resupinata	6	o		o	o	o				o	x		x					
Utricularia vulgaris	1									x								
Fontinalis antipyretica	16	o			o	o	x	x	x	x	x	x	x		x	x	x	x

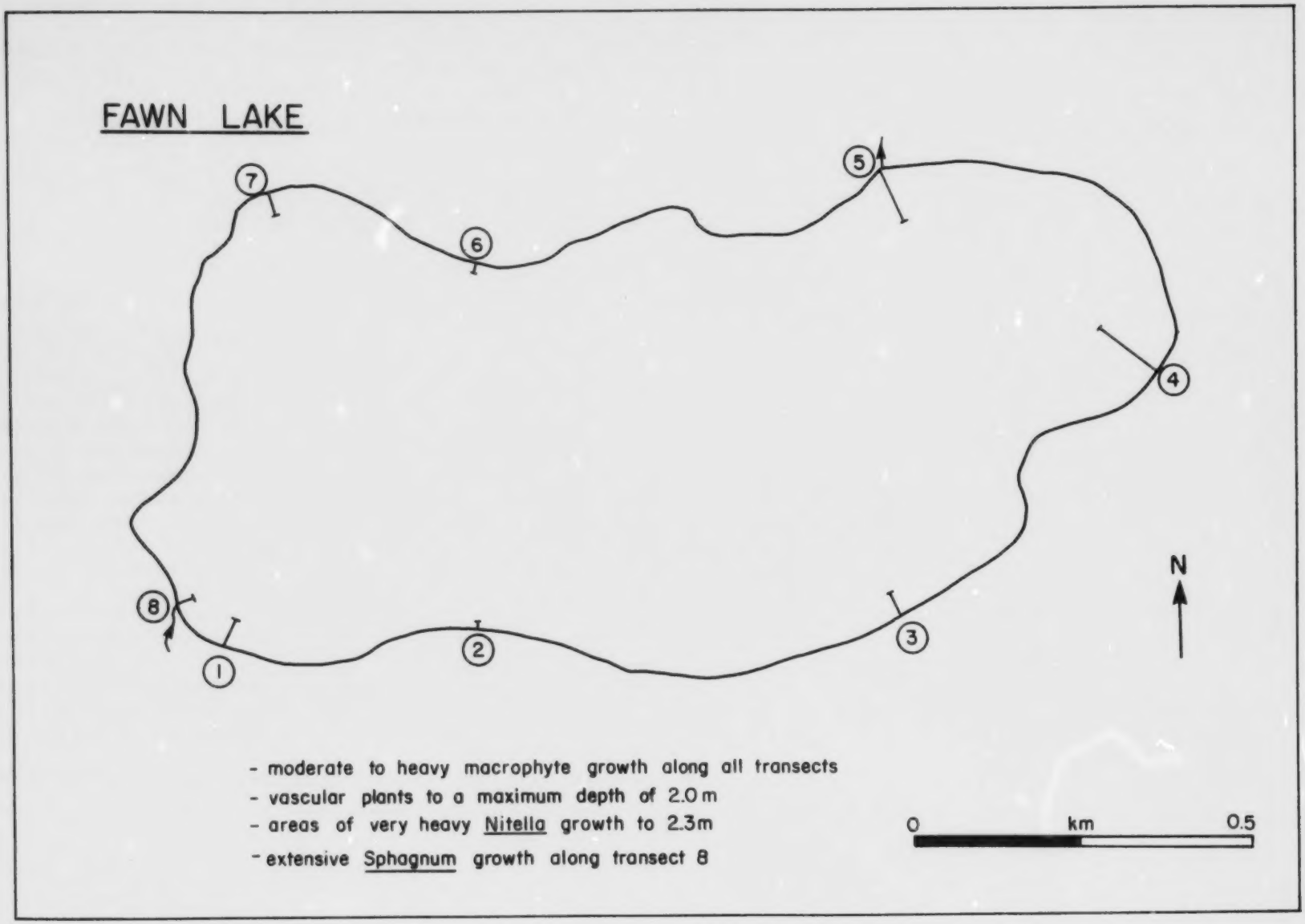

FAWN LAKE
7
6
5
4
8
1
2
3
N
- moderate to heavy macrophyte growth along all transects
- vascular plants to a maximum depth of 2.0 m
- areas of very heavy Nitella growth to 2.3m
- extensive Sphagnum growth along transect 8
0
km
0.5

FIG. A-11

FAWN LAKE
(Aug. 1/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1	2	3			4		5		6	7	8
DEPTH ZONE (m)		0 2.0	0 1.5	0 0.3	0.3 0.8	0.8 1.2	0 1.0	1.0 2.3	0 0.3	1.0 2.3	0 1.0	0 1.0	0 1.0
TOTAL		o	o	o	*	*	o	*	o	*	o	*	*
Brasenia Schreberi	6	x		x			o		x			x	x
Eleocharis acicularis	3		x									x	x
Eriocaulon septangulare	4	x		x			x					o	
Isoetes sp.	4	x		x					x			x	
Juncus pelocarpus	2			x			o						
Juncus militaris	1			x									
Lycopus sp.	1			x									
Nuphar variegatum	3	x					x						x
Nymphaea odorata	8	x	x	x			x		x		o	o	o
Pontederia cordata	6	x	x				x				x	x	x
Potamogeton capillaceus	1			x									
Potamogeton epihydrus	4	x	x										o
Potamogeton natans	3								x			x	x
Potamogeton Oakesianus	1	x											
Sagittaria sp.	4			x			x		x			x	
Sparganium sp.	4	x	x				x					x	
Utricularia gibba	1			x	x								
Utricularia resupinata	5	x	x	x					x			o	
Vallisneria americana	4		x				x		x		o		
Nitella flexilis	5	o	o					*		*		x	
Nitella tenuissima	1		x										
Fissidens fontanus	1				x								
Fontinalis antipyretica	6	x	x	x	*	*			x			o	o
Sphagnum cuspidatum	1												*
Sphagnum subsecundum platyphyllum	1	x											

Table A11

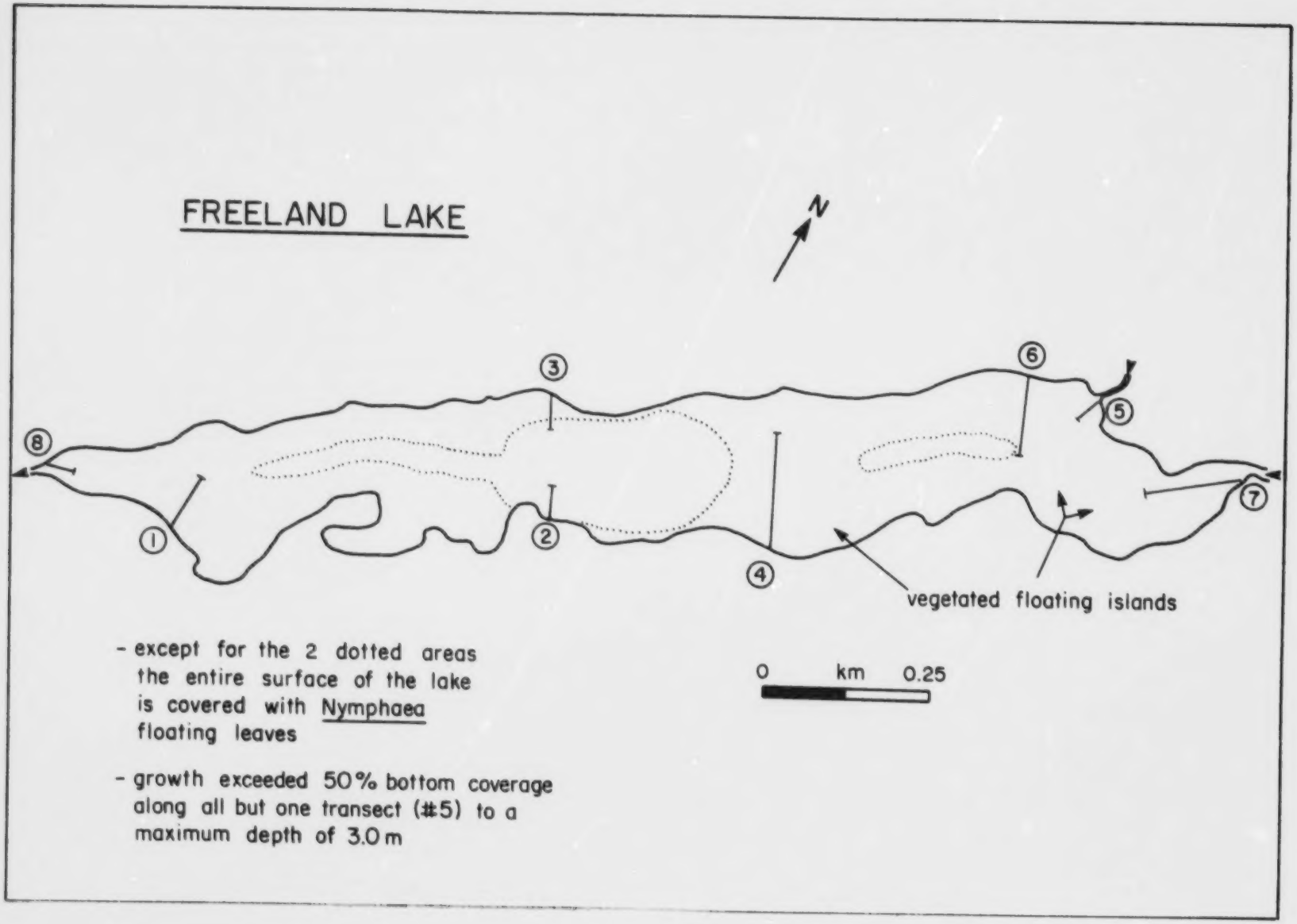

FREELAND LAKE
N
1
2
3
4
5
6
7
8
vegetated floating islands
- except for the 2 dotted areas the entire surface of the lake is covered with Nymphaea floating leaves
- growth exceeded 50% bottom coverage along all but one transect (#5) to a maximum depth of 3.0 m
0 km 0.25

FIG. A-12

FREELAND LAKE
(July 12/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1		2		3	4		5	6			7	8		
DEPTH		0	1.6	0	2.0	0	0	1.3	0	0	0.5	0.6	0	0	1.0	1.5
ZONE (m)		1.6	2.2	2.0	3.0	2.0	1.3	1.8	0.5	0.5	0.6	2.5	0.5	1.0	1.5	2.5
TOTAL		*	*	o	*	*	*	*	x	o	*	*	*	*	*	*
Brasenia Schreberi	6	o		x		x					x	x	o			x
Eleocharis acicularis	2			x										o		
Eriocaulon septangulare	2			x					x							
Isoetes sp.	2								x					x		
Juncus militaris	5	x	x	x	o	x						x		x		
Lycopus sp.	1						x									
Nuphar variegatum	2						x						x			
Nymphaea odorata	8	x		o	x	o	*	*	x	o	o	o	o	x		x
Pontederia cordata	7	x	x			x		x	x	x	x		o	x		
Potamogeton confervoides	6	x	o	x	o	x			x			o		*	o	o
Potamogeton epihydrus	5	x					x					x	x	x	o	x
Potamogeton natans	3	x	x				x							x		x
Potamogeton Oakesianus	3	x			x									x	x	
Sparganium sp.	7			x	x	x	x	x	x			x	x	x	x	x
Utricularia purpurea	8	*	*	x	o	o	x	x	x	x	*	*	o	x	x	o
Utricularia vulgaris	7	x	x	x	x	x	*	x		x	o	x	x	x	x	x
Sphagnum subsecundum contortum	2	x							x							

Table A12

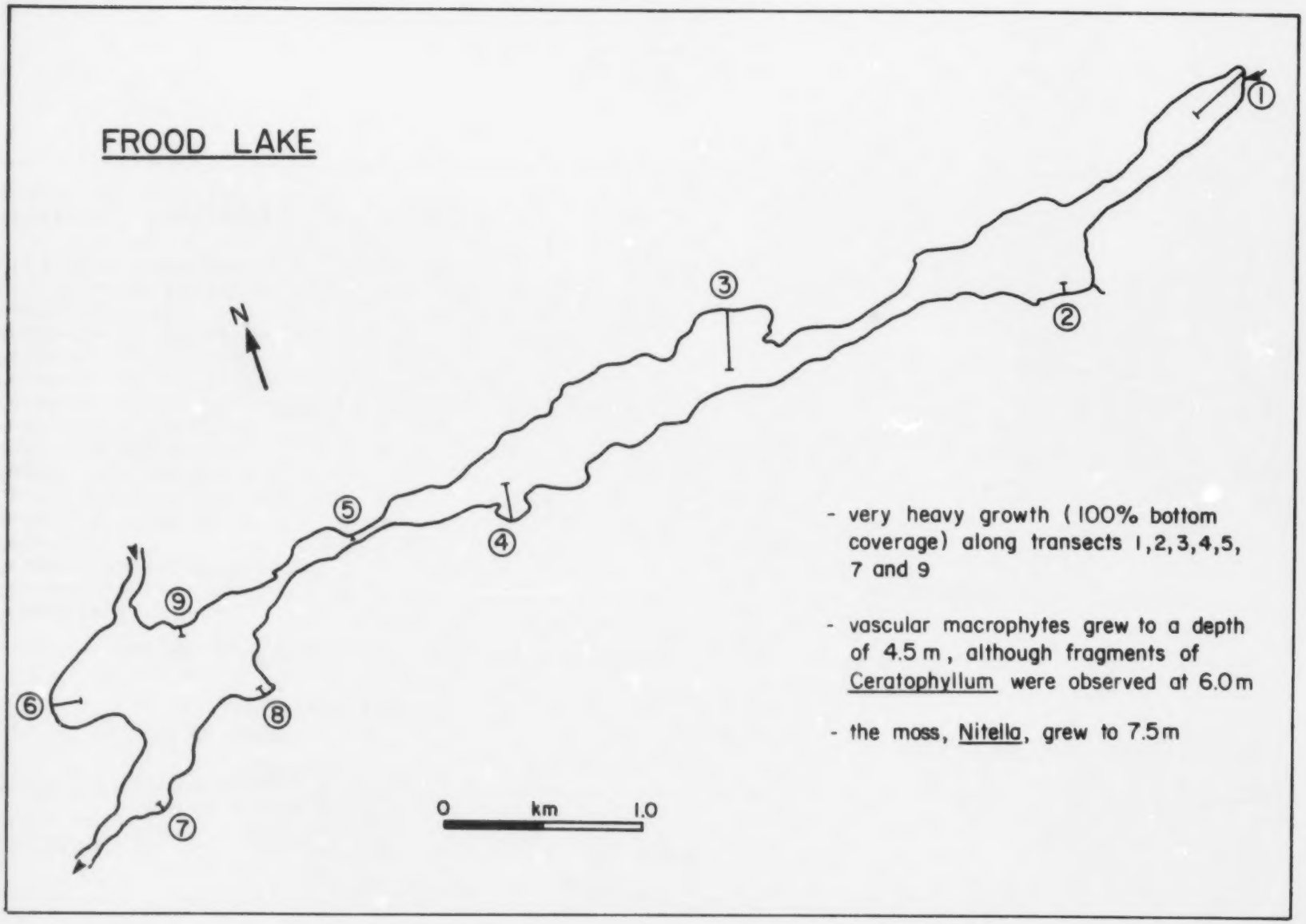

FROOD LAKE
N
1
2
3
4
5
6
7
8
9
0
km
1.0
- very heavy growth (100% bottom coverage) along transects 1,2,3,4,5, 7 and 9
- vascular macrophytes grew to a depth of 4.5 m, although fragments of Ceratophyllum were observed at 6.0 m
- the moss, Nitella, grew to 7.5 m

FIG. A-13

FROOD LAKE
(Aug. 21/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (•)

		TRANSECT	1			2		3			4				5	6				7		8	9	
		DEPTH	0	1.2	2.0	0	1.5	0	1.5	4.5	0	1.3	3.5	4.5	0	0	1.3	3.0	4.5	0	1.5	0	0	2.5
		ZONE (m)	1.2	2.0	3.0	1.5	4.0	1.5	3.5	7.5	1.3	2.5	4.5	7.5	1.5	1.3	3.0	4.5	7.0	1.5	4.6	3.0	2.5	4.0
		TOTAL	•	•	•	•	o	•	o	•	•	•	o	•	•	o	o	o	o	•	•	x	•	x
Brasenia Schreberi	5		•			o					o				o								x	
Ceratophyllum demersum	2							x		x				o										
Elatine minima	7		x			x		x			x					x				x			x	
Eleocharis spp. (2)	5		x			x									x	x				x				
Elodea canadensis	5			x	x						x	x			x							x	x	
Eriocaulon septangulare	8		x	o		•		•			x				x	x				o			x	
Isoetes sp.	9			x	x	x	o		o		x	o	o		x	x	o			o	•	x	x	x
Juncus pelocarpus	8			x		x		o			o				x	o				o			x	
Juncus militaris	3		x								x				o									
Lobelia Dortmanna	7			x		x		x			x	x				x				x			x	
Lycopus sp.	3		x																	x		x		
Myriophyllum alterniflorum	1																						o	
Myriophyllum Farwellii	3		o	x											x					x				
Myriophyllum heterophyllum	1			x																				
Myriophyllum tenellum	7			o			o	x			o	o				x				x			x	
Najas flexilis	8		x	x	x				x		x	x			x		x			x	x	x	x	
Nupher variegatum	4		x			x									x	x								
Nymphaea odorata	9		x	x		x		x			o				o	x				x		x	x	x
Nymphoides cordatum	7		x	x				x			x				o	x				x			x	
Polygonum natans	1		x																					
Pontederia cordata	4		x			x		x			x													
Potamogeton amplifolius	2			x											x									
Potamogeton Berchtoldii	3															x						x	o	x
Potamogeton capillaceus	3		o	x	x	x	x								x									
Potamogeton epihydrus	6		x			x			x						x					x			x	
Potamogeton foliosus	3			x	x										x					x				
Potamogeton natans	1		x																					
Potamogeton obtusifolius	3					x										x	x	x		x	x			
Potamogeton Richardsonii	5				x										x	x				x	x		x	
Potamogeton Spirillus	8		x			x		x	x						x	x				x	x	x	x	x
Ranunculus reptans	6					x		x			x					x				x			x	
Sagittaria sp.	7		x	o		x	x	x			x				x	x	x			o				
Sparganium sp.	9		o	x		x		o				x			o	x				x		x	x	
Utricularia gibba	1														x									
Utricularia intermedia	1		x																					
Utricularia purpurea	3		o	x							x	o	x		x									
Utricularia vulgaris	4		x			x					x				x									
Vallisneria americana	8		x	x	o		x		o		x	o				x	o	o		o	o	x	x	x
Chara vulgaris	3		x	o	•					•		x	•											
Nitella sp.	3														x	x	x	x	o	x				
Nitella tenuissima	9		x	x		x	o	x			x	x			x	x				o		x	x	x
																							x	
Drepanocladus sp.	1																			x				
Fontinalis antipyretica	7		x	x		x		x			x	x			x					x		x		

Table A13

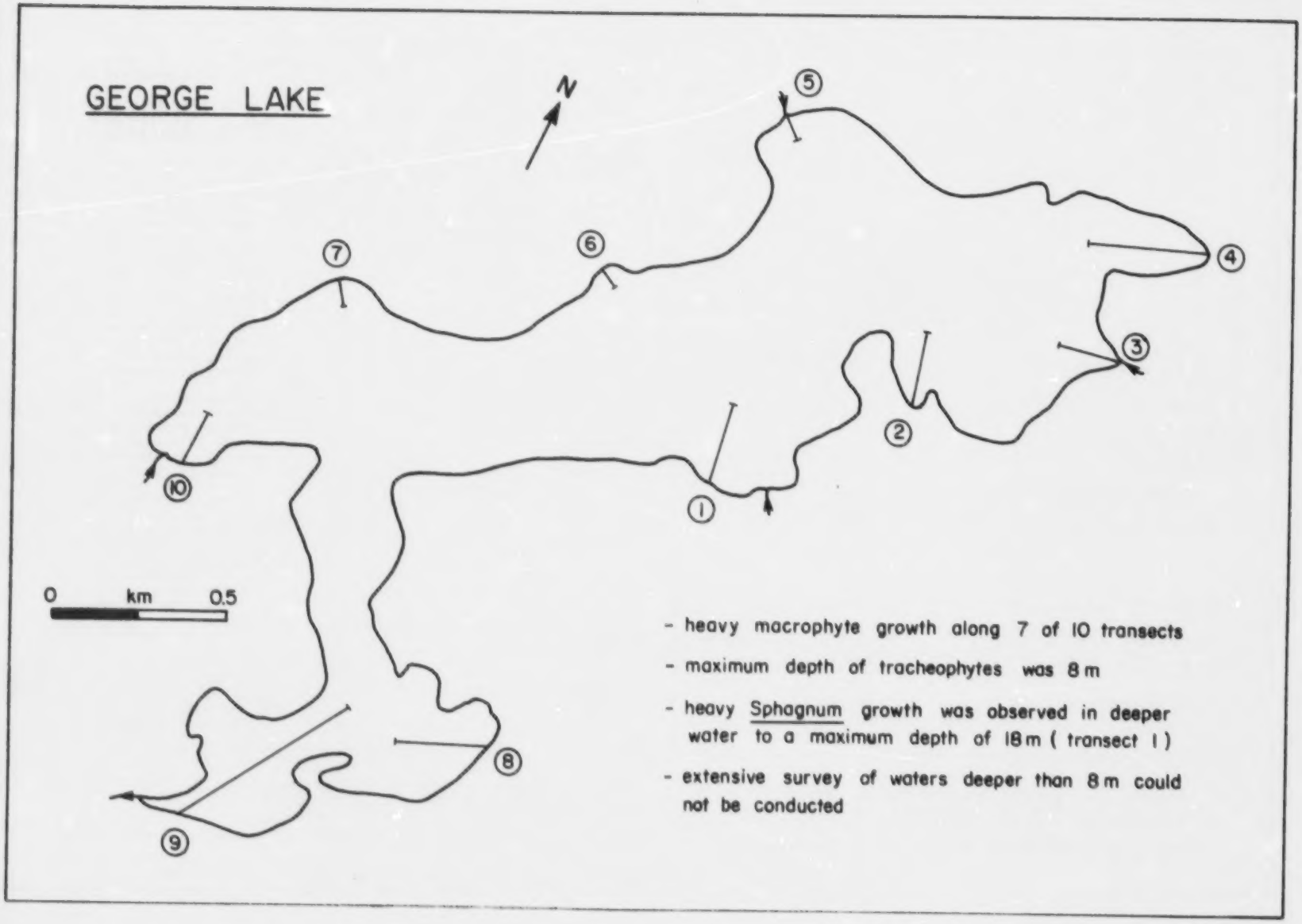

GEORGE LAKE
N
0 km 0.5
- heavy macrophyte growth along 7 of 10 transects
- maximum depth of tracheophytes was 8 m
- heavy Sphagnum growth was observed in deeper water to a maximum depth of 18 m (transect 1)
- extensive survey of waters deeper than 8 m could not be conducted

FIG. A-14

GEORGE LAKE[1]
(July 12/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

	TRANSECT	1					2		3			4				5	
	DEPTH	0	1.0	2.1	5.0	11.0	0	1.0	0.5	1.3	7.2	0	0.5	4.5	6.5	0	2.0
	ZONE (m)	1.0	2.1	5.0	11.0	18.0	1.0	7.2	1.3	7.2	8.	0.5	4.5	6.5	8.	2.0	6.5
	TOTAL	x	o	o	*	x	*	*	*	*	*	o	*	*		o	o
Brasenia Schreberi	1																
Elatine minima	4															x	
Eleocharis acicularis	5	x					x		x			x	x				
Eriocaulon septangulare	10	x	o									x	x			x	
Isoetes sp.	10	x		o			*		*			o				x	
Juncus pelocarpus	8	x					x	x		x			o			x	
Lobelia Dortmanna	7	x					x		o			o	o			x	
Lycopus sp.	7						x		x			x					
Myriophyllum Farwellii	1								x			x	x			x	
Myriophyllum tenellum	4													o			
Nymphaea odorata	5						x	o		x		x	x				
Pontederia cordata	2						x	x	x			x				x	
Pontamogeton confervoides	9	x															
Potamogeton epihydrus	1							o	o	*	o	o	o	*	x	x	o
Ranunculus reptans	1																
Sagittaria sp.	3								x								
Sparganium sp.	9		x				x	x	x			x	x			x	
Utricularia purpurea	6				x			x	x	o	x	x	o	o			
Utricularia vulgaris	8				x			x					x			x	
Drepanocladus sp.	1																
Fontinalis sp.	2					x											
Hygroamblystegium tenax	1					x											
Sphagnum subsecundum platyphyllum	7				*	x				*					o		
Sphagnum teres	1																

Plant growth exceeded 9m on transects 3,4,6 and 8, but technical problems necessitated stopping mapping at 8m.

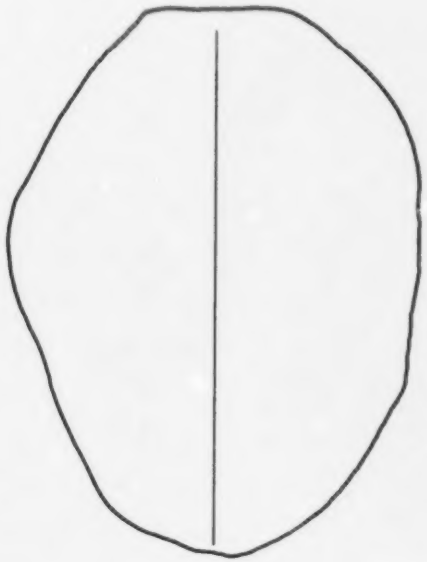
Table A14

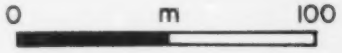
GEORGE LAKE (Cont'd.)

TRANSECT		6			7			8			9				10		
DEPTH		0	2.0	5.5	0	1.0	6.0	0	1.0	6.0	0	2.0	5.5	7.5	0	1.5	3.0
ZONE (m)		2.0	5.5	8.	1.0	6.0	8.0	1.0	6.0	8.	2.0	5.5	7.5	13.0	1.5	3.0	8.0
TOTAL		o	o	o	x	x	o	o	x	*	x	o	o	*	*	o	x
Brasenia Schreberi	1																
Elatine minima	4																
Eleocharis acicularis	5				x										o		
Eriocaulon septangulare	10	x			x			x			x				o		
Isoetes sp.	10	x	x		x	x		x	x		x	o			o		
Juncus pelocarpus	8	x									x					x	
Lobelia Dortmanna	7				x						x				x		
Lycopus sp.	7	x			x						x				x	x	
Myriophyllum Farwellii	1										x				x		
Myriophyllum tenellum	4											o					
Nymphaea odorata	5				x												
Pontederia cordata	2				x			x									
Pontamogeton confervoides	9	x			x							x	x			x	
Potamogeton epihydrus	1														x		
Ranunculus reptans	1							x									
Sagittaria sp.	3										x				o		
Sparganium sp.	9	x			x			x							x	x	
Utricularia purpurea	6											x	x			x	x
Utricularia vulgaris	8		x			x	x					x					x
Drepanocladus sp.	1													o			
Fontinalis sp.	2											x					
Hygroamblystegium tenax	1																
Sphagnum subsecundum platyphyllum	7		x	o			o			*			o	*			
Sphagnum teres	1										x						

GORHAM & GORDON #4

- surveyed one transect across middle of lake
- Eleocharis was the dominant and deepest growing (1.8m) vascular plant
- 100% Drepanocladus coverage from 2 to 5 m





- not drawn to scale

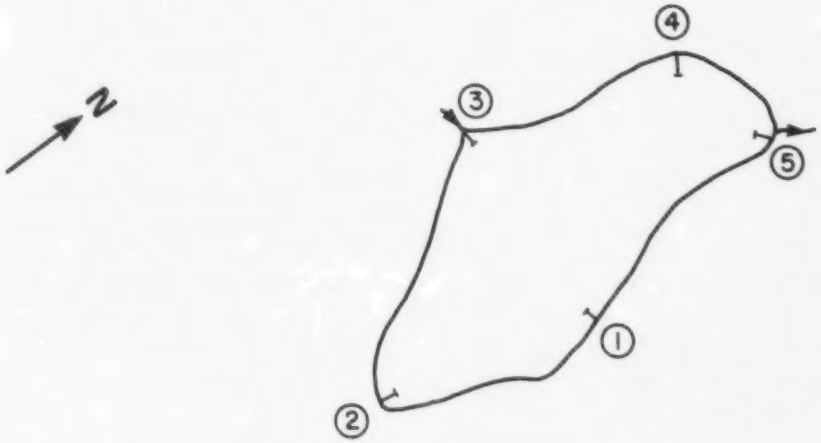
FIG. A-15

G.&G. 4 Bottom Cover - <5% (x), 5-50% (o), >50% (*)
(June 12/79)

TRANSECT	1		
DEPTH ZONE (m)	0 0.8	0.8 1.8	1.8 5.0
TOTAL	*	o	*
Eleocharis acicularis	o	o	
Juncus pelocarpus	o	x	
Nuphar variegatum	x		
Sagittaria sp.	x		
Sparganium sp.	x	x	
Drepanocladus exannulatus			*
Pohlia nutans schimperii	x		

Table A15

GORHAM & GORDON #8



- macrophyte growth rarely exceeded 1% bottom coverage anywhere in the lake
- maximum depth of plant growth was 3m

0 m 200

- not drawn to scale

FIG. A-16

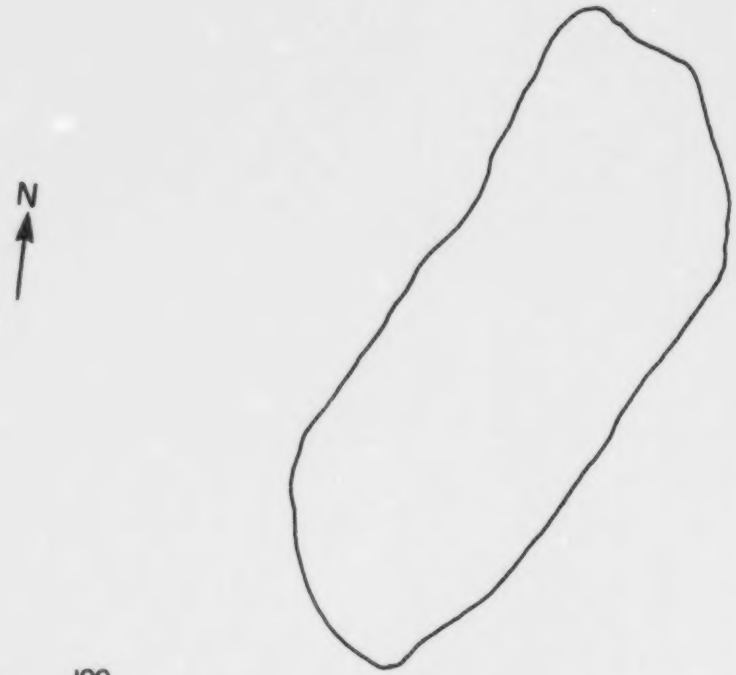
Table A16

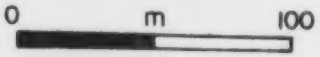
Bottom Cover - <5% (x), 5-50% (o), >50% (*)

G.&G. 8
(June 12/79)

TRANSECT	1	2	3	4	5
DEPTH ZONE (m)	0 2.0	0 2.0	0 2.0	0 3.0	0 2.0
TOTAL	x	x	x	x	o
Eleocharis acicularis					o
Juncus pelocarpus			x		
Nuphar variegatum			x		
Potamogeton pusillus	x	x	x	x	
Sagittaria sp.			x		
Sparganium sp.	x	x	x	x	x

GORHAM & GORDON #14





- not drawn to scale

- surveyed entire perimeter of lake
- only a few scattered plants because of the lack of suitable sites (most of the inshore areas were comprised of steep sloped rocky bottoms)

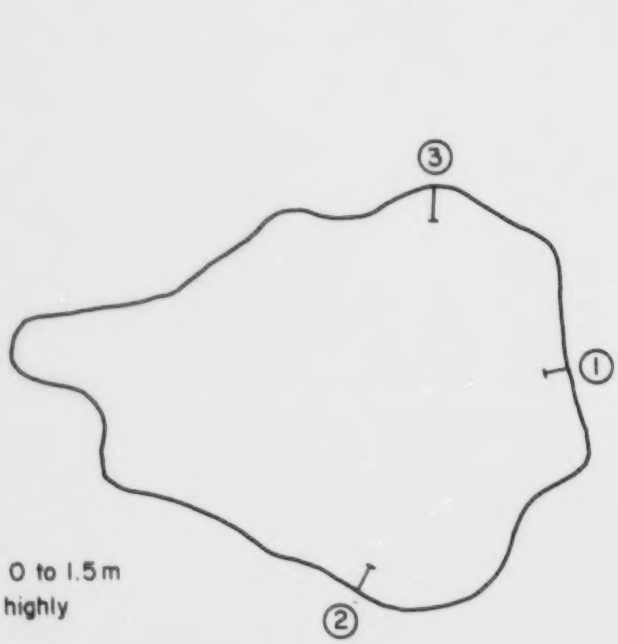
FIG. A-17

Table A17

Bottom Cover - <5% (x), 5-50% (o), >50% (*)
G.&G. 14
(June 13/79)

	TRANSECT	1
	DEPTH	0
	ZONE (m)	1.5
	TOTAL	x
Juncus sp.		x
Sparganium sp.		x
Cladopodiella fluitans		x
Pohlia nutans schimperii		x

GORHAM & GORDON #21



- heavy macrophyte growth from 0 to 1.5 m and lighter growth to 2.5 m, in highly coloured waters
- dominant plants are Eleocharis and Eriocaulon

0 m 200

- not drawn to scale

FIG. A-18

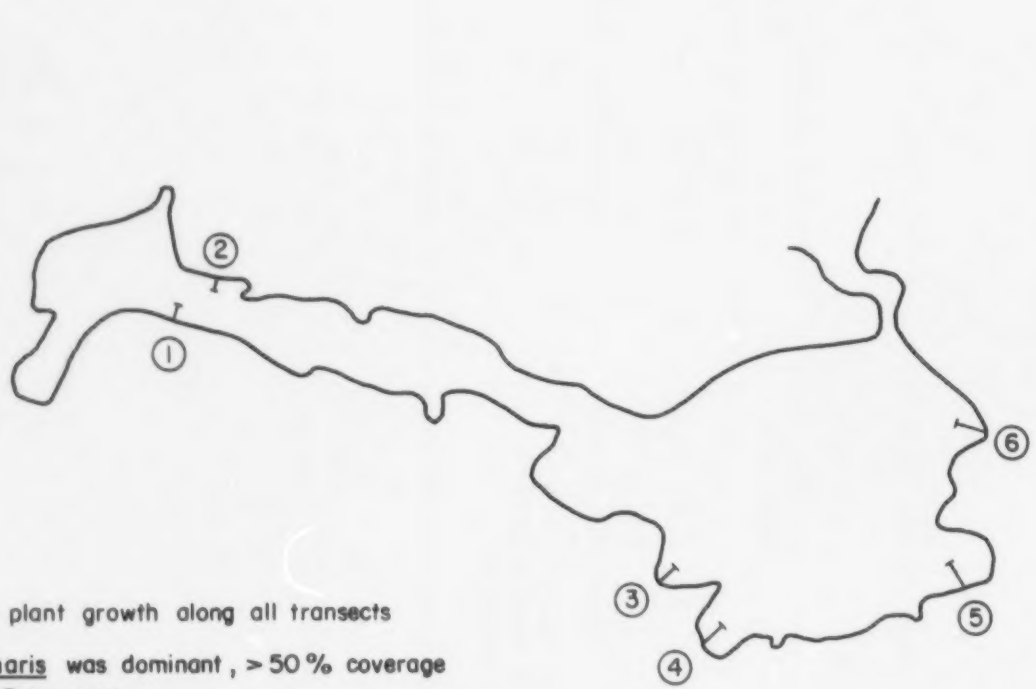
Table A18

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

G.&G. 21
(Aug. 23/79)

TRANSECT	1		2		3	
DEPTH ZONE (m)	0 1.5	1.5 2.5	0 1.5	1.5 2.5	0 1.5	1.5 2.5
TOTAL	*	o	*	o	*	x
Eleocharis acicularis	*	x	*	o	o	x
Eriocaulon septangulare	o	o	o	x	*	x
Nuphar variegatum			x			

GORHAM & GORDON # 54



- heavy plant growth along all transects
- Eleocharis was dominant, > 50 % coverage along 5 transects
- maximum depth of plant growth was 4m

FIG. A-19

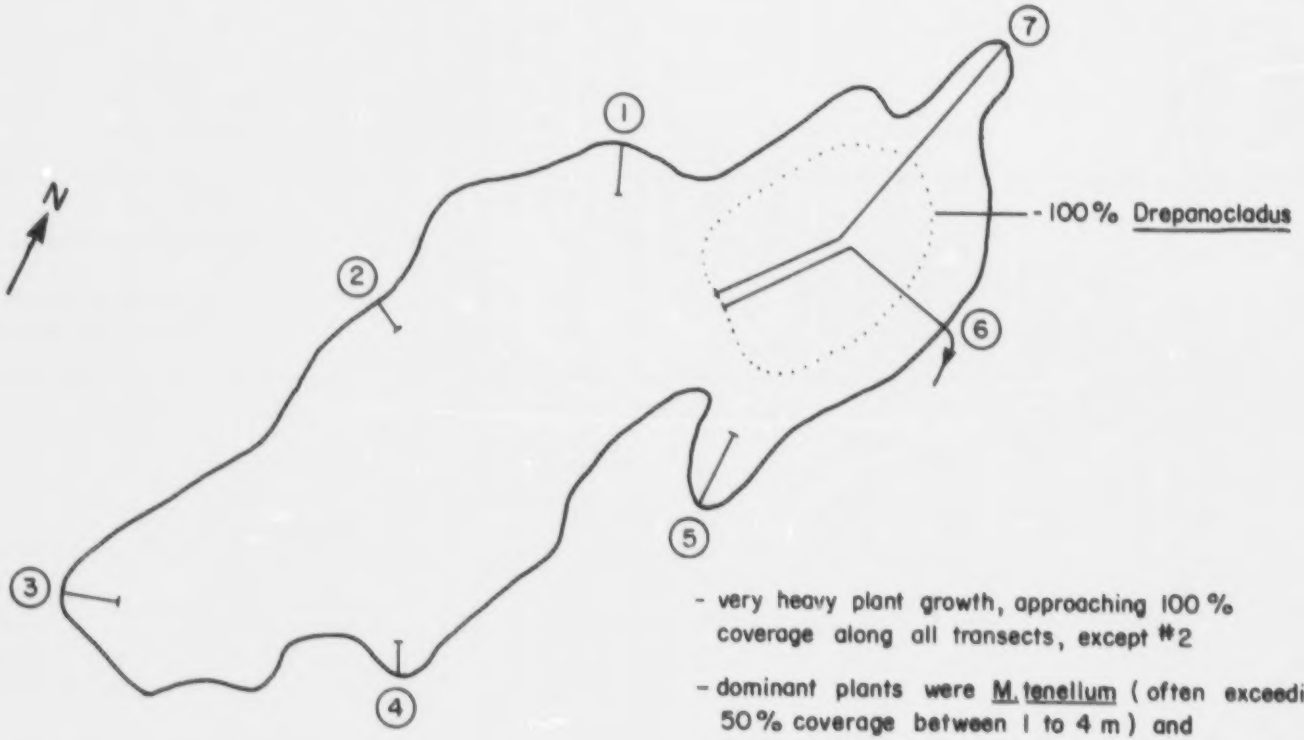
G.&G. 54
(June 14/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT	1		2		3		4		5	6	
DEPTH	0	1.0	0	1.0	0	0.5	0	0.5	0	0	0.5
ZONE (m)	1.0	4.0	1.0	4.0	0.5	2.0	0.5	3.0	1.5	0.5	2.0
TOTAL	*	*	*	*	o	*	x	*	*	x	*
Eleocharis acicularis	*	*	*	*	o	*		*	*	x	o
Juncus pelocarpus	x		x			x					x
Pohlia nutans schimperii	x	o	x	o	x		x	x	x	x	o

Table A19

GORHAM & GORDON #75



0 km 0.25

- not drawn to scale

- very heavy plant growth, approaching 100% coverage along all transects, except #2
- dominant plants were M. tenellum (often exceeding 50% coverage between 1 to 4 m) and Drepanocladus (with 100% coverage from 4 to 8m in the north end of the lake)
- Isoetes was the deepest growing vascular plant, with 100% coverage from 4 to 5m along transect 3

FIG. A-20

G.&G. 75
(Aug. 16/79)

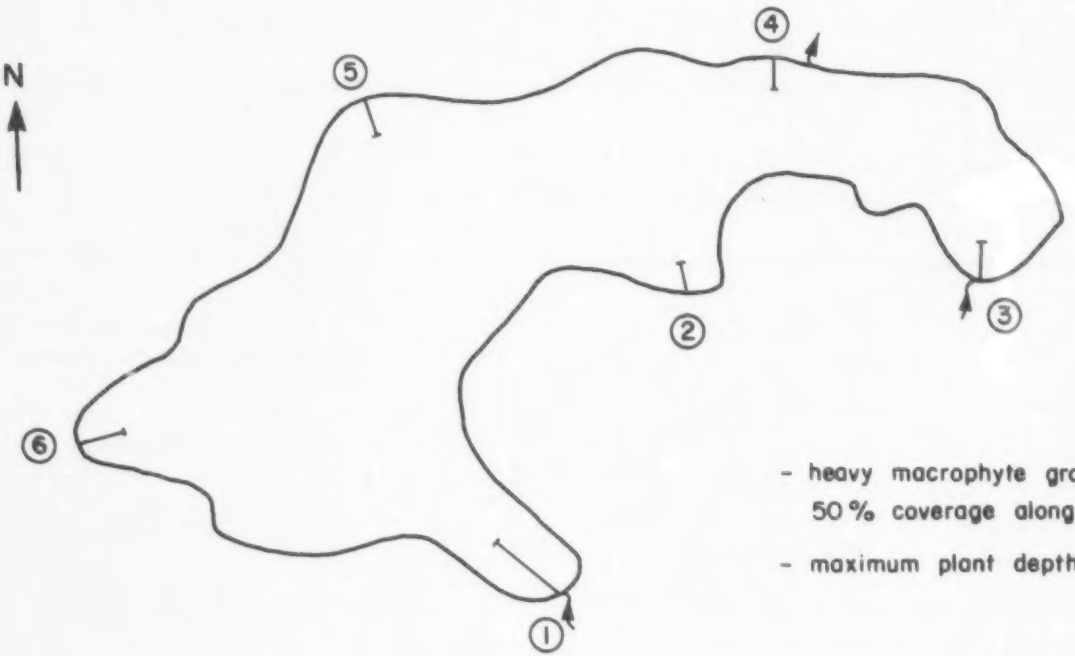
Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1			2		3					4	
DEPTH		0	1.5	3.0	0	1.7	0	1.0	1.6	3.0	4.0	0	1.8
ZONE (m)		1.5	3.0	3.5	1.7	2.2	1.0	1.6	3.0	4.0	5.0	1.8	3.8
TOTAL		x	*	x	o	x	*	*	*	*	*	*	*
Eleocharis acicularis	5				o		*	o				o	
Eriocaulon septangulare	7	x			o		o	o				o	
Isoetes sp.	5	x	x	x		x	x			x	*		
Myriophyllum tenellum	6		*			x	x	o	o	*		x	*
Nuphar variegatum	2												
Nymphaea odorata	2												
Pontederia cordata	3				x		x					x	
Sparganium sp.	7	x			x		x					x	
Drepanocladus exannulatus	5				x		x	*	*	o			
Sphagnum subsecundum platyphyllum	1						x						

TRANSECT		5			6		7			
DEPTH		0	1.2	1.7	0	4.5	0	1.3	2.6	4.5
ZONE (m)		1.2	1.7	4.0	1.0	8.0	1.3	2.6	4.0	8.0
TOTAL		*	*	*	x	*	*	*	*	*
Eleocharis acicularis	5	o	o				o			
Eriocaulon septangulare	7	*	x	x	x		o	x		
Isoetes sp.	5			x					o	
Myriophyllum tenellum	6		o	*			o	*	*	
Nuphar variegatum	2	x			x					
Nymphaea odorata	2	x			x					
Pontederia cordata	3				x					
Sparganium sp.	7	x			x		x	x		
Drepanocladus exannulatus	5	o	*	x		*	x		x	*
Sphagnum subsecundum platyphyllum	1									

Table A20

GORHAM & GORDON #94



- heavy macrophyte growth (exceeding 50 % coverage along all but one transect)
- maximum plant depth was 6.5 m (Nitella)

0 km 0.25

- not drawn to scale

FIG. A-21

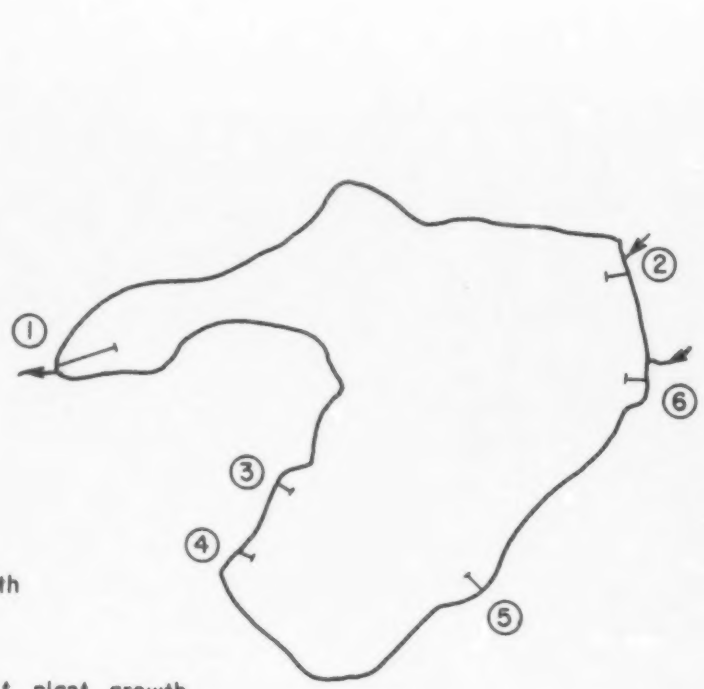
G.&G. 94
(Aug. 15/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1			2			3			4		5		6		
DEPTH ZONE (m)		0 2.0	2.0 4.0	4.0 6.5	0 2.0	2.0 4.0	4.0 6.5	0 2.0	2.0 3.0	3.0 6.0	0 3.0	3.0 6.5	0 2.0	2.0 6.0	0 3.0	3.0 4.0	4.0 6.5
TOTAL		*	o	*	*	*	*	*	o	o	o	o	*	*	*	*	o
Brasenia Schreberi	1														x		
Eleocharis acicularis	6	o			x			x			x		x		x		
Eriocaulon septangulare	6	o			o			x			o		o		o		
Isoetes sp.	5		x		x	o		x	o		o					*	
Lobelia Dortmanna	2										x		x				
Lycopus sp.	3							x			x				x		
Myriophyllum tenellum	4				o						x		o	*	*		
Nuphar variegatum	3	x						x						x			
Nymphaea odorata	5	x			x			o					o		x		
Potamogeton epihydrus	4	x						x			x				x		
Potamogeton spirillis	6	x			x			o			x		o		x		
Sagittaria sp.	3							x			x		x				
Sparganium sp.	4	x						x			x				x		
Utricularia gibba	5	o			x						x		x		x		
Utricularia purpurea	5		o		x	o					x		x	x	x		
Utricularia vulgaris	4	x						x					x		x		
Nitella flexilis	6	x	x	*			*			o		o		o		o	
Nitella tenuissima	6	x			x			x			x		x		x		
Drepanocladus exannulatus	4	o			o			x							x		
Fontinalis antipyretica	1										x						
Sphagnum palustre	1				x												
Sphagnum subsecundum platyphyllum	3	x			x								x				

Table A21

GORHAM & GORDON #103



- variable macrophyte growth
- Eriocaulon is dominant
- coloured water limited most plant growth to < 1m, although some species extended this range to 3m

0 km 0.5

- not drawn to scale

FIG. A-22

Table A22

G.&G. 103
(Aug. 14/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

	TRANSECT	1	2		3	4	5	6	
	DEPTH	0	0	1.0	0	0	0	0	1.0
	ZONE (m)	1.0	1.0	3.0	0.7	1.0	1.2	1.0	2.3
	TOTAL	o	*	x	o	o	o	*	*
Eleocharis acicularis	4	x	x		x		x		
Eriocaulon septangulare	5	o	*	x	o	x	o		
Isoetes sp.	2					x	o		
Juncus militaris	6	x	x		x	x	x	o	o
Juncus pelocarpus	3	x	o				x		
Lobelia Dortmanna	4	x	x		x		x		
Myriophyllum Farwellii	1					x			
Myriophyllum tenellum	1		x						
Nuphar variegatum	1							x	
Nymphaea odorata	5	x	x		x	x		o	
Potamogeton Berchtoldii	2					x	x		
Potamogeton epihydrus	5	x	x			x	x	x	
Potamogeton natans	1							x	
Sagittaria sp.	3				x		x	x	
Sparganium sp.	3	x			x			o	x
Utricularia gibba	3	x	x	x	x				
Utricularia intermedia	3		x		x			o	x
Utricularia purpurea	5	x	x	x	x	x		o	
Utricularia vulgaris	1							o	x
Nitella tenuissima	2	x					x		
Drepanocladus exannulatus	1		x	x					

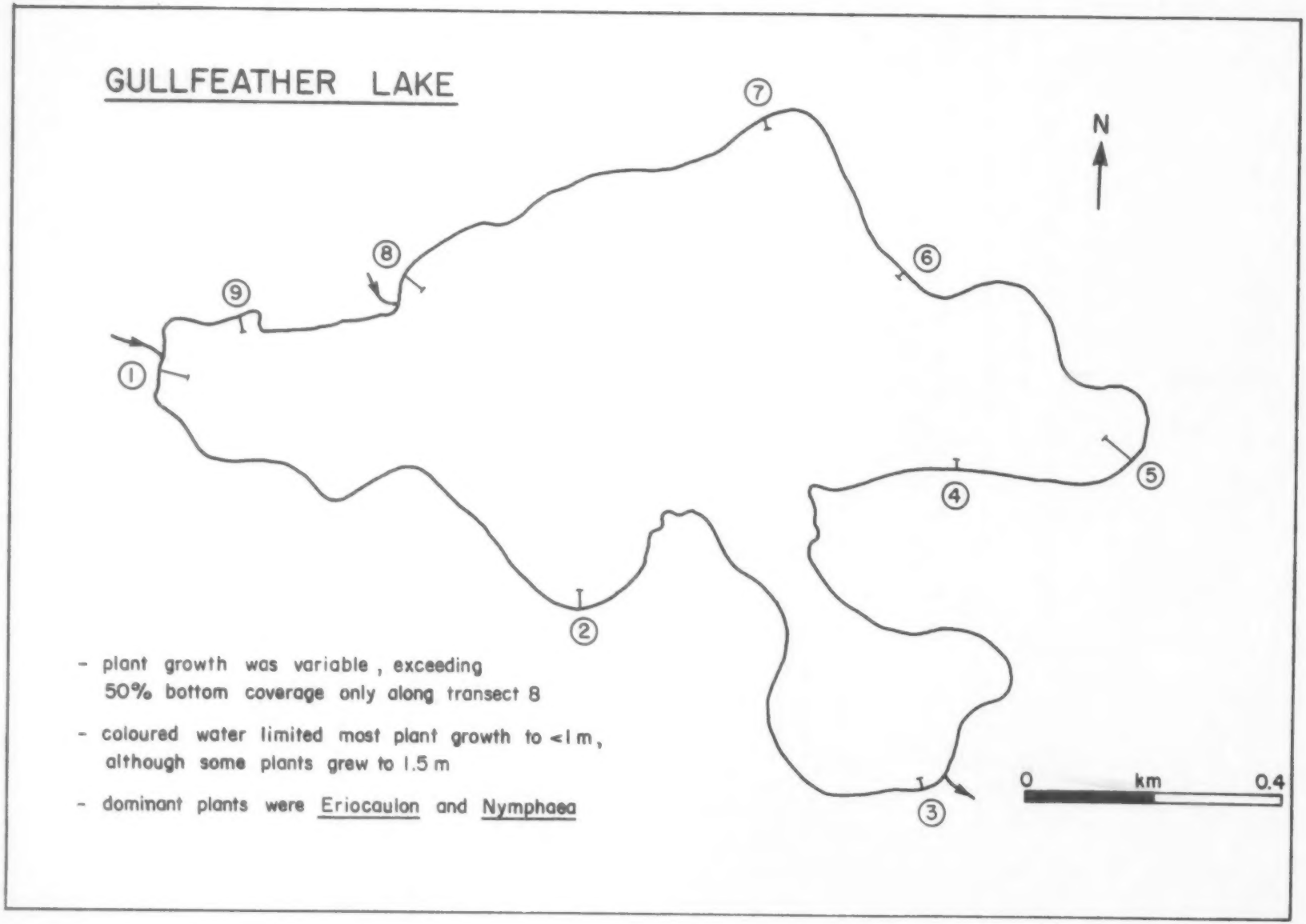

GULLFEATHER LAKE
N
1
2
3
4
5
6
7
8
9
- plant growth was variable, exceeding 50% bottom coverage only along transect 8
- coloured water limited most plant growth to <1 m, although some plants grew to 1.5 m
- dominant plants were Eriocaulon and Nymphaea
0
km
0.4

FIG. A-23

GULLFEATHER LAKE Bottom Cover - <5% (x), 5-50% (o), >50% (*)
(June 6/79)

TRANSECT		1		2		3	4	5		6	7	8		9
DEPTH		0	1.0	0	0.5	0	0	0	0.5	0	0	0	0.3	0
ZONE (m)		1.0	1.5	0.5	1.0	0.3	0.8	0.5	1.0	0.6	0.6	0.3	0.8	0.8
TOTAL		o	o	o	o	x	o	o	x	o	o	*	o	o
Brasenia Schreberi	1			x										
Eleocharis acicularis	1		x											
Eriocaulon septangulare	9	o		o		x	o	o		o	o	*		o
Isoetes sp.	3			x				x			x			
Juncus militaris	2					x						x		
Lobelia Dortmanna	4	x				x					x	x		
Lycopus sp.	7	x		x			x	x		x	x	x		
Myriophyllum tenellum	3							x		x	x			
Nuphar variegatum	3			x			x				x			
Nymphaea odorata	8	o	o	o	o		x	x	x	x	x	x		o
Pontederia cordata	9	o		x		x	x	x		x	x	x		x
Potamogeton epihydrus	2	x												o
Potamogeton natans	2						x					x		
Potamogeton Oakesianus	1													x
Sparganium sp.	2	x	x								x			
Utricularia resupinata	1												o	
Utricularia vulgaris	2	x										x		
Fontinalis antipyretica	5			o		x	x	x				x	x	
Sphagnum subsecundum contortum	1									x				

Table A23

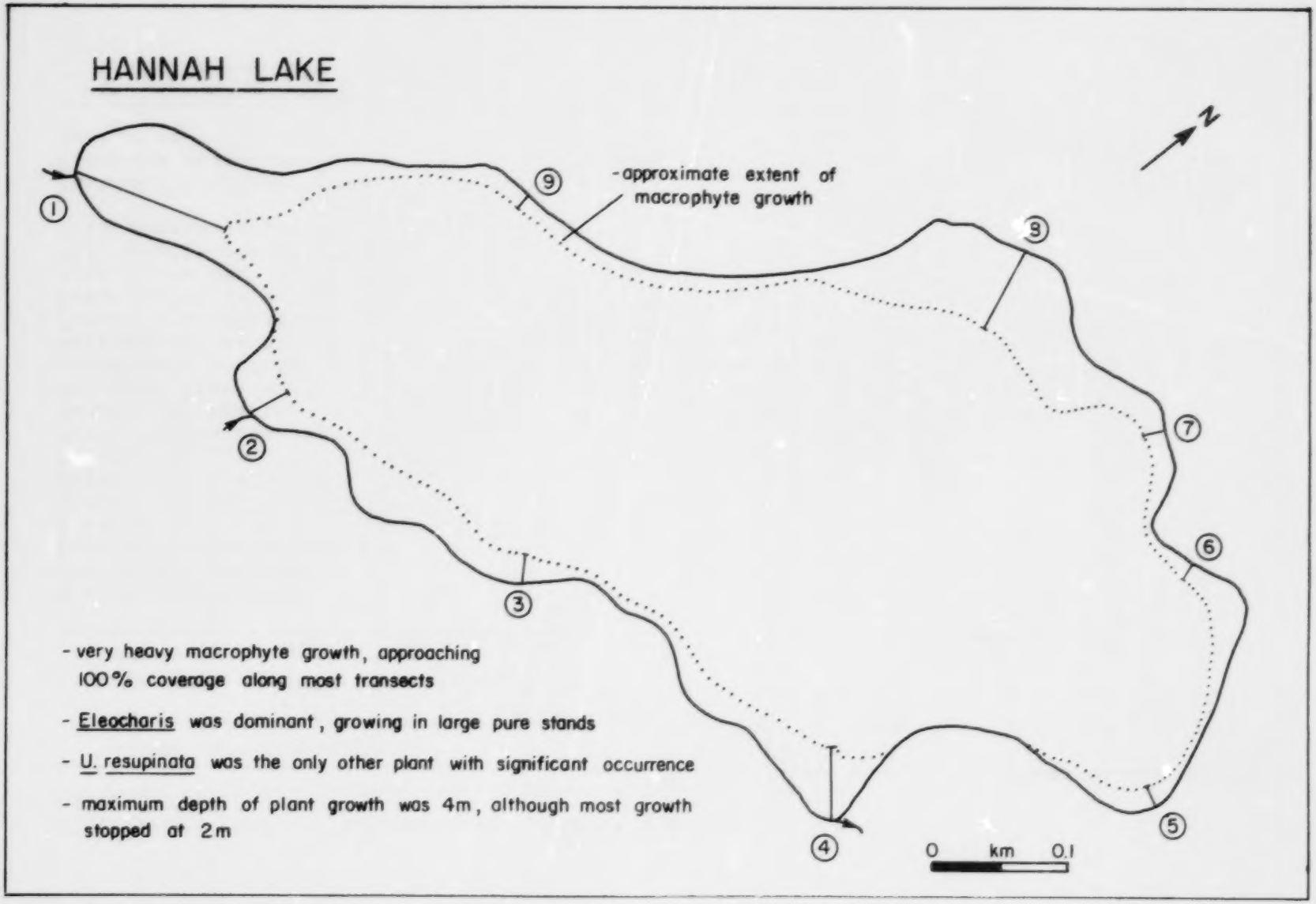

HANNAH LAKE
N
-approximate extent of macrophyte growth
1
2
3
4
5
6
7
8
9
- very heavy macrophyte growth, approaching 100% coverage along most transects
- Eleocharis was dominant, growing in large pure stands
- U. resupinata was the only other plant with significant occurrence
- maximum depth of plant growth was 4m, although most growth stopped at 2m
0 km 0.1

FIG. A-24

HANNAH LAKE
(July 18/78)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1		2		3		4	5	6		7	8	9	
DEPTH		0.3	0.8	0	0.5	0	0.5	0.5	0	0	1.2	0	0	0	2.5
ZONE (m)		0.8	2.4	0.5	2.0	0.5	1.0	1.0	2.0	0.3	2.0	2.0	1.6	2.5	4.0
TOTAL		x	*	*	*	o	*	*	*	o	o	*	*	*	x
Eleocharis acicularis	9	x	*	o	*		*	*	*	o	o	*	*	*	x
Eriocaulon septangulare	2		x										x		
Isoetes sp.	1			x											
Juncus pelocarpus	5	x		x		o	x	x	x						
Pontederia cordata	1	x													
Sagittaria sp.	1											x			
Utricularia resupinata	4	x	x	o	o			o	o						
Drepanocladus sp.	9	x	x	x	x	x	x	x	x	x		x	x	x	

Table A24

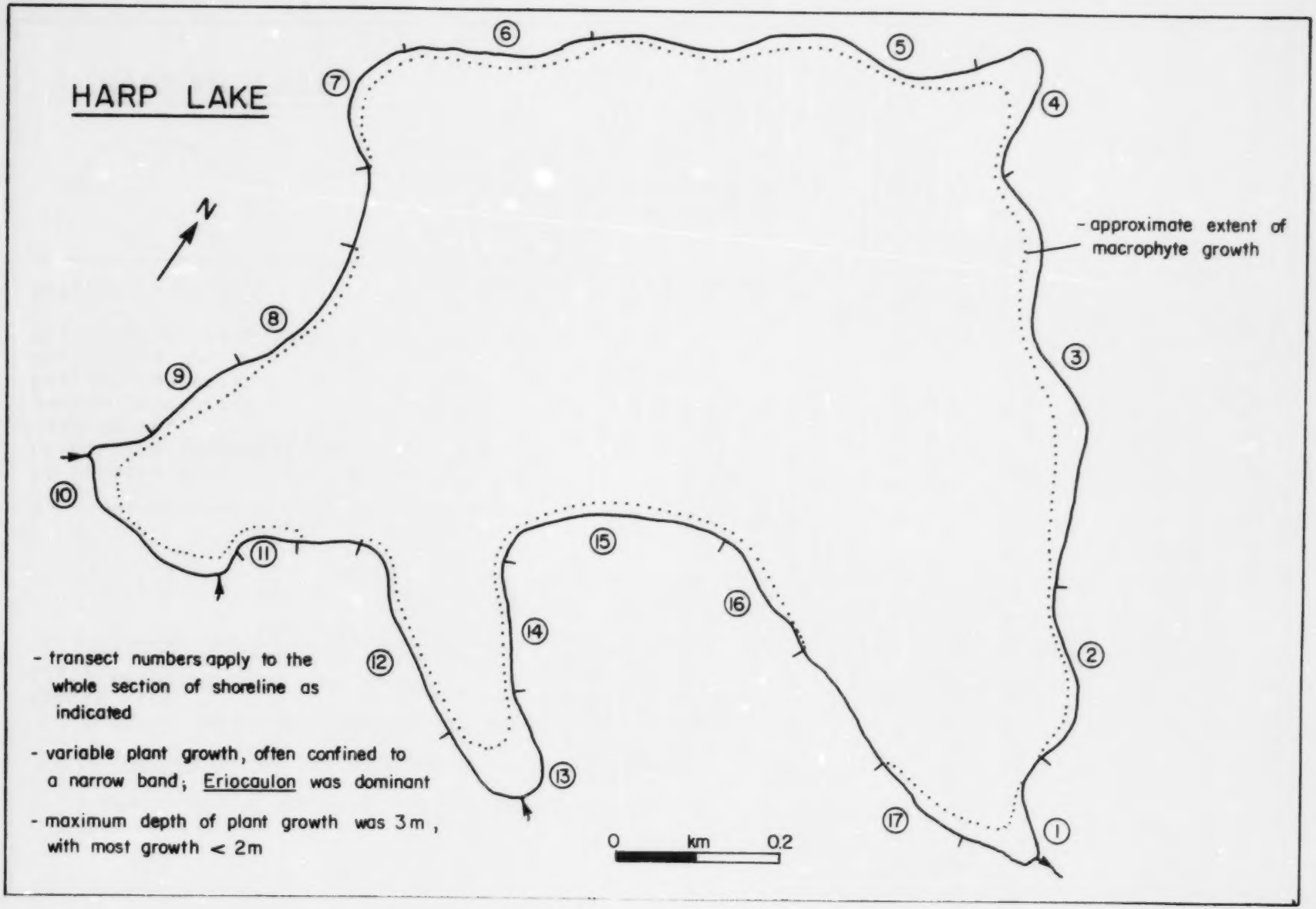

HARP LAKE
N
- approximate extent of macrophyte growth
- transect numbers apply to the whole section of shoreline as indicated
- variable plant growth, often confined to a narrow band; Eriocaulon was dominant
- maximum depth of plant growth was 3 m, with most growth < 2 m
0 km 0.2
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17

FIG. A-25

HARP LAKE
(May 30/78)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1		2	3	4	5		6	7	8	9	10
DEPTH		0	1.2	0	0	0	0	2.0	0.5	0	0.4	0.5	0
ZONE (m)		1.2	2.0	2.0	2.0	2.0	2.0	3.0	1.5	1.5	0.6	1.0	1.5
TOTAL		*	x	o	x	o	o	x	x	o	o	o	*
Eleocharis acicularis	3			x	x	x							
Eriocaulon septangulare	14	*	x	o	x	x	o		x	o	o	o	*
Isoetes sp.	7							x		x	x		
Juncus pelocarpus	5	x		x			x						
Lobelia Dortmanna	7	x		x	x		x		x				
Nuphar variegatum	1									x			
Pontederia cordata	3									x	x		
Sparganium sp.	4	x		x		x							
Utricularia minor	1					x							
Utricularia vulgaris	1					x							
Nitella flexilis	2					x				x			
Fontinalis antipyretica	4			x		x							
Sphagnum sp.	1			x									

Table A25

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

HARP LAKE (Cont'd.)
(May 30/78)

TRANSECT		11	12	13	14	15	16	17	
DEPTH		0.5	0.5	0	0.5	1.0	0	0.5	1.0
ZONE (m)		1.0	1.0	2.0	1.5	1.5	1.0	1.0	2.0
	TOTAL	x	x	o	*	x	*	o	x
Eleocharis acicularis	3								
Eriocaulon septangulare	14			o	*		*	o	
Isoetes sp.	7			x		x	o		x
Juncus pelocarpus	5				x	x			
Lobelia Dortmanna	7			x				o	
Nuphar variegatum	1								
Pontederia cordata	3		x						
Sparganium sp.	4				x				
Utricularia minor	1								
Utricularia vulgaris	1								
Nitella flexilis	2								
Fontinalis antipyretica	4	x		x					
Sphagnum sp.	1								

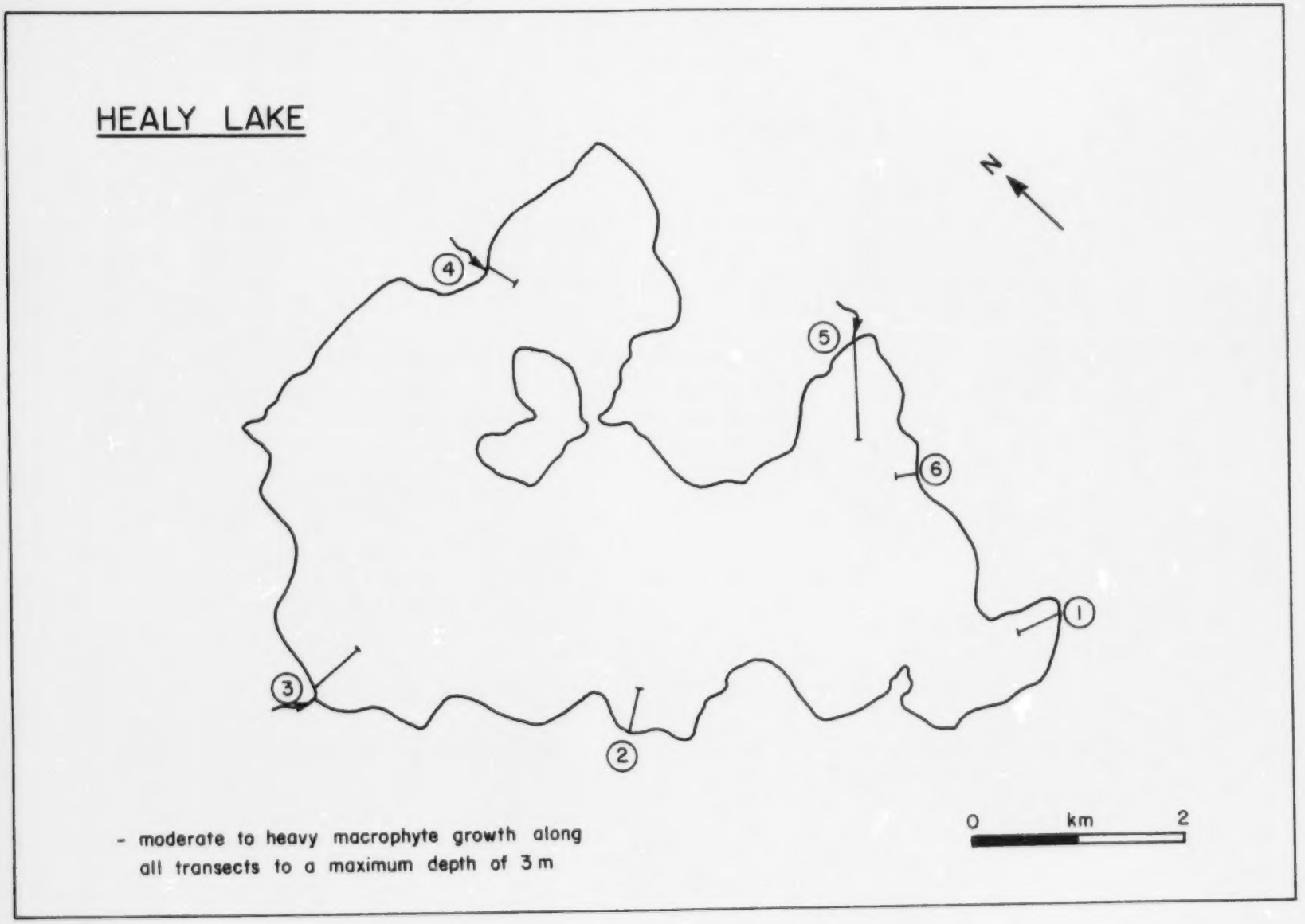

HEALY LAKE
N
4
5
6
1
3
2
0
km
2
- moderate to heavy macrophyte growth along all transects to a maximum depth of 3 m

FIG. A-26

HEALEY LAKE
(June 20/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1		2		3		4		5		6	
DEPTH		0	1.0	0	1.0	0	1.0	0	1.0	0	1.0	0	1.0
ZONE (m)		1.0	2.5	1.0	2.5	1.0	2.5	1.0	3.0	1.0	2.0	1.0	2.0
TOTAL		o	*	*	o	o	o	o	o	*	o		o
Brasenia Schreberi	3						x	x		x			
Eleocharis acicularis	1									x			
Eriocaulon septangulare	5			o		o		o		o		o	
Isoetes sp.	1											x	
Juncus militaris	6	x	*	o	o		o	x		o	o	x	x
Juncus pelocarpus	1											x	
Lobelia Dortmanna	3			x		x						x	
Myriophyllum tenellum	4			x		o					o	o	o
Nymphaea odorata	4	o	o	o	x	x	x	o					
Nymphoides cordatum	1									o			
Pontederia cordata	6	x		x		x		x		x		x	
Potamogeton confervoides	5	x	x	x		x		x		x		x	
Potamogeton epihydrus	2							x		x			
Potamogeton natans	1					x							
Sparganium sp.	1							x					
Utricularia intermedia	2			x				x					
Utricularia purpurea	4			x	x	x	x				x	x	x
Utricularia resupinata	4			x		o		x				x	x
Utricularia vulgaris	5	x	x		x	x	x	x	x	o	x		
Vallisneria americana	2							o	o	o			
Fontinalis antipyretica	4	x	x	x		o						x	
Sphagnum cuspidatum	1	x											

Table A26

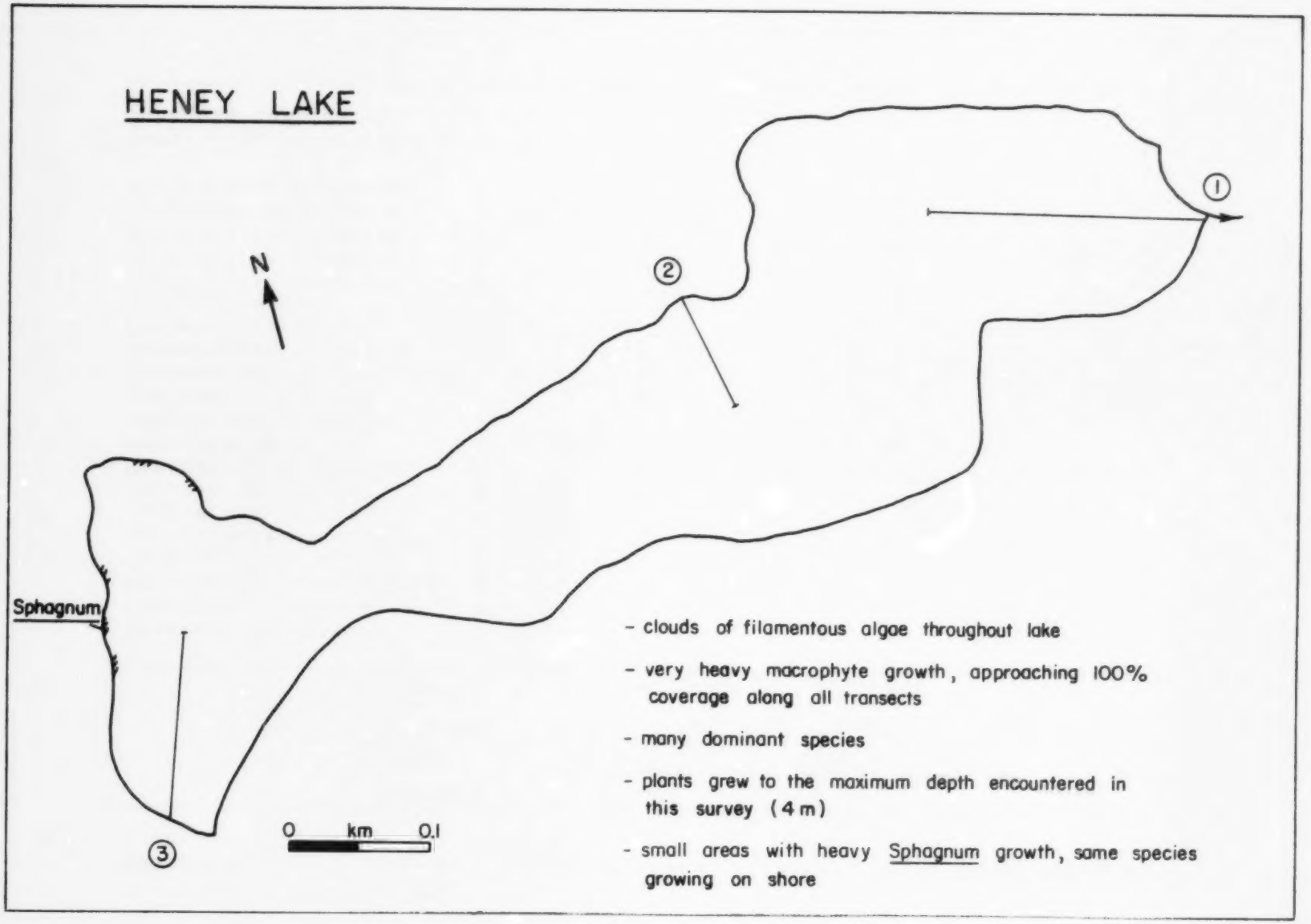

HENEY LAKE
N
①
②
③
Sphagnum
0 km 0.1
- clouds of filamentous algae throughout lake
- very heavy macrophyte growth, approaching 100% coverage along all transects
- many dominant species
- plants grew to the maximum depth encountered in this survey (4 m)
- small areas with heavy Sphagnum growth, same species growing on shore

FIG. A-27

HENEY LAKE
(July 31/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1				2				3			
DEPTH		0	1.0	2.6	3.6	0	1.0	3.0	3.6	0	1.0	2.5	3.7
ZONE (m)		1.0	2.5	3.6	4.0	1.0	3.0	3.6	3.8	1.0	2.5	3.7	4.0
TOTAL		*	*	*	*	*	*	*	*	*	*	*	x
Brasenia Schreberi	3	x	x			x				x	x	x	x
Eleocharis acicularis	1	x											
Eleocharis Robbinsii	1					x							
Eriocaulon septangulare	3	o	x			*	x			o			
Isoetes sp.	3		x	*	x	x		*	x		x	*	
Juncus militaris	3	x	x			x	x			x	x		
Juncus pelocarpus	2	x					x						
Lobelia Dortmanna	2	x				x	x						
Lycopus sp.	1	x											
Myriophyllum tenellum	3	x	*			x	o				*		
Najas flexilis	3	x	x	x	o				o				x
Nymphaea odorata	3	x				x	x			x			
Nymphoides cordatum	3	x	x		x	x		x		o	x	x	
Pontederia cordata	3	x	x			x	x			x			
Potamogeton Berchtoldii	1		x		x								
Potamogeton capillaceus	1					x							
Potamogeton confervoides	3	x	x	x	o	x		x	o		x	x	x
Potamogeton epihydrus	1					x							
Potamogeton natans	1									o	x		
Potamogeton Oakesianus	1					x							
Sparganium sp.	2	x					x						
Utricularia gibba	3	x	x	x	o	x		x	x	x			x
Utricularia purpurea	3		x	x	o	x	o	x	x		x	x	
Utricularia resupinata	3	o	x			x	o				x		
Utricularia vulgaris	2					x				x			
Nitella gracilis	2			x		x							
Nitella tenuissima	1	x			x								
Fontinalis antipyretica	2	x				x	x						
Sphagnum sp.	1									x			

Table A27

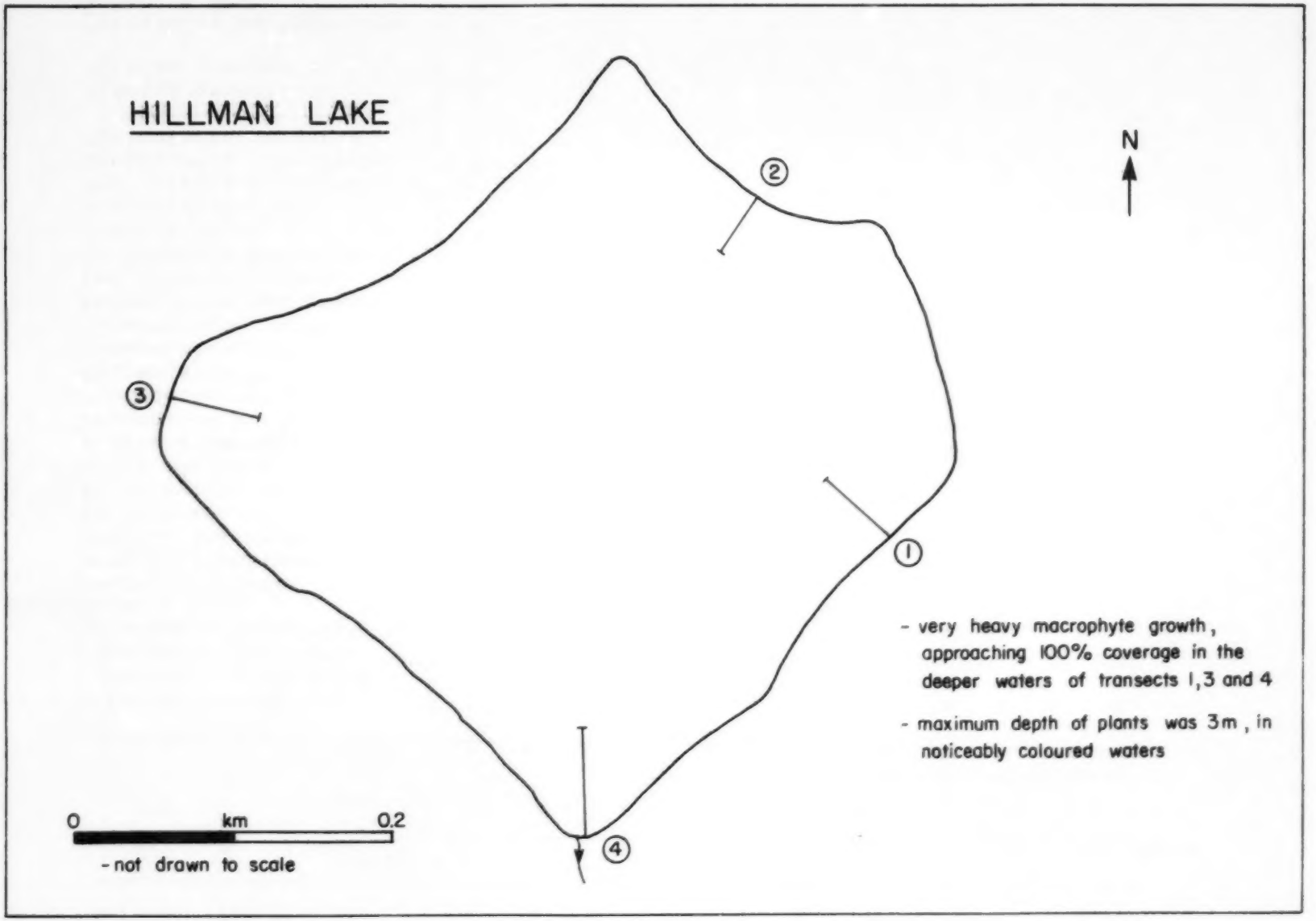

HILLMAN LAKE
N
2
3
1
4
- very heavy macrophyte growth, approaching 100% coverage in the deeper waters of transects 1, 3 and 4
- maximum depth of plants was 3m, in noticeably coloured waters
0
km
0.2
- not drawn to scale

FIG. A-28

Table A28

HILLMAN LAKE (Aug. 9/78)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

	TRANSECT	1		2		3		4	
	DEPTH	0	1.2	0	1.5	0	0.7	0	2.0
	ZONE (m)	1.2	2.7	1.5	3.0	0.7	3.0	2.0	3.0
	TOTAL	o	*	o	o	o	*	*	*
Brasenia Schreberi	3			x			o	o	
Eriocaulon septangulare	3	o		o				o	
Juncus militaris	4	o	x	x		x	o	o	
Juncus pelocarpus	1	o							
Myriophyllum tenellum	1			x					
Najas flexilis	4	x	o	x	o		o		o
Nuphar variegatum	3			x		o		o	
Nymphaea odorata	3			x		o		o	
Pontederia cordata	4	x	x	x		x		x	
Potamogeton amplifolius	4	x		x	x		o	x	
Potamogeton epihydrus	3	x		x				x	
Potamogeton obtusifolius	2		x					x	
Potamogeton pusillus	3		x		x		x		
Potamogeton Robbinsii	3	x	x				*	o	
Utricularia intermedia	3		x	x				x	
Utricularia purpurea	4	x	o		o			o	o
Utricularia resupinata	2	o	x	o					
Utricularia vulgaris	3			x		x		x	
Nitella sp.	3		o	o	o				*

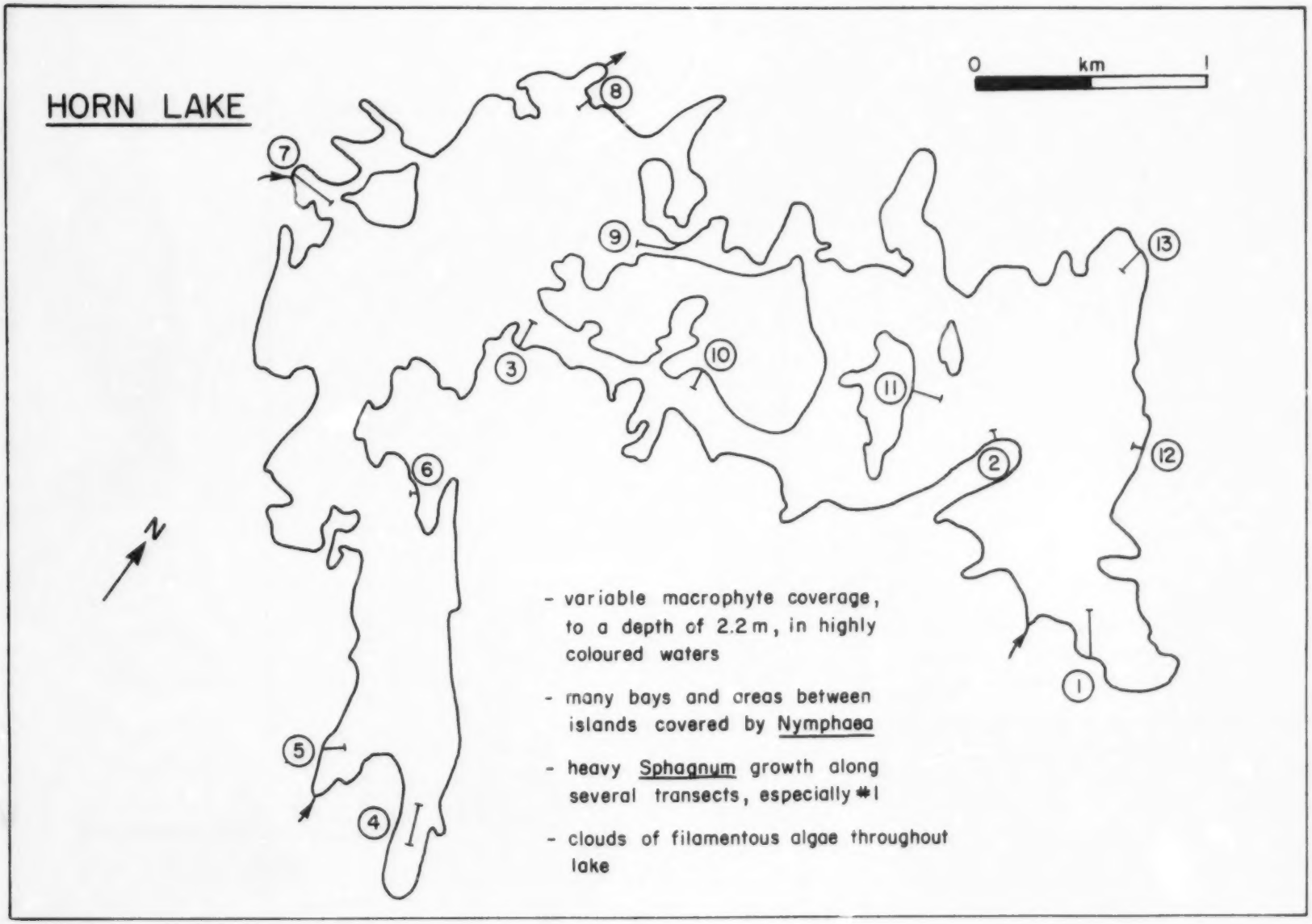

HORN LAKE
0 km 1
N
- variable macrophyte coverage, to a depth of 2.2 m, in highly coloured waters
- many bays and areas between islands covered by Nymphaea
- heavy Sphagnum growth along several transects, especially #1
- clouds of filamentous algae throughout lake

FIG. A-29

HORN LAKE
(Aug. 7/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1	2		3	4		5		6	7	8	
DEPTH ZONE (m)		0 1.0	0 1.0	1.0 1.5	0 2.0	0 1.0	1.0 2.0	0 1.0	1.0 2.0	0 2.0	0 1.0	0 1.0	1.0 2.2
TOTAL		*	*	o	*	*	x	o	x	x	*	*	*
Brasenia Schreberi	6	x						x			x		
Eleocharis acicularis	3		x		o							x	
Juncus militaris	7		x			o		x			o	x	
Lycopus sp.	12	x	x		x	x		x		x	x	x	
Nuphar variegatum	10					o	x	x	x	x	o	x	x
Nymphaea odorata	5	x			x	x					x		
Polygonum natans	6	x			o			x				x	o
Pontederia cordata	2					x							
Potamogeton epihydrus	5				x			x					x
Potamogeton foliosus	1							o					
Potamogeton natans	3					x		x			x		
Potamogeton Oakesianus	1							x					
Sparganium sp.	8	x	x		x	o				x	o	x	
Utricularia vulgaris	11	x	o		o	o	x	o	x		▫	o	o
Drepanocladus exannulatus	8	o	o			o					o		x
Fontinalis antipyretica	8		o	o		x	x	x		x			x
Sphagnum cuspidatum	7	*	o		o			x			x		
Sphagnum subsecundum platyphyllum	4				x							o	o

Table A29

HORN LAKE (Cont'd.)
(Aug. 7/79)

TRANSECT		9		10		11		12	13		
DEPTH		0.8	1.3	0	0.7	0	1.6	0	0	0.5	1.0
ZONE (m)		1.3	2.0	0.7	2.0	1.6	2.1	1.0	0.5	1.0	2.0
	TOTAL	*	x	*	o	o	x	x	o	o	x
Brasenia Schreberi	6	x		x	x	x					
Eleocharis acicularis	3										
Juncus militaris	7	o	x	o	x						
Lycopus sp.	12	x		x		x			x	x	
Nuphar variegatum	10	o	x	x	x	x		x	x	x	x
Nymphaea odorata	5			x							
Polygonum natans	6	x		x	x						
Pontederia cordata	2		x								
Potamogeton epihydrus	5	x	x	x	x						
Potamogeton foliosus	1										
Potamogeton natans	3										
Potamogeton Oakesianus	1										
Sparganium sp.	8			x	x						
Utricularia vulgaris	11	o	x	o	x	x		x			
Drepanocladus exannulatus	8		x	x	x	x					
Fontinalis antipyretica	8		x			x	x		x	o	x
Sphagnum cuspidatum	7	o	x	x	x						
Sphagnum subsecundum platyphyllum	4					o			x		

KRAMER LAKE

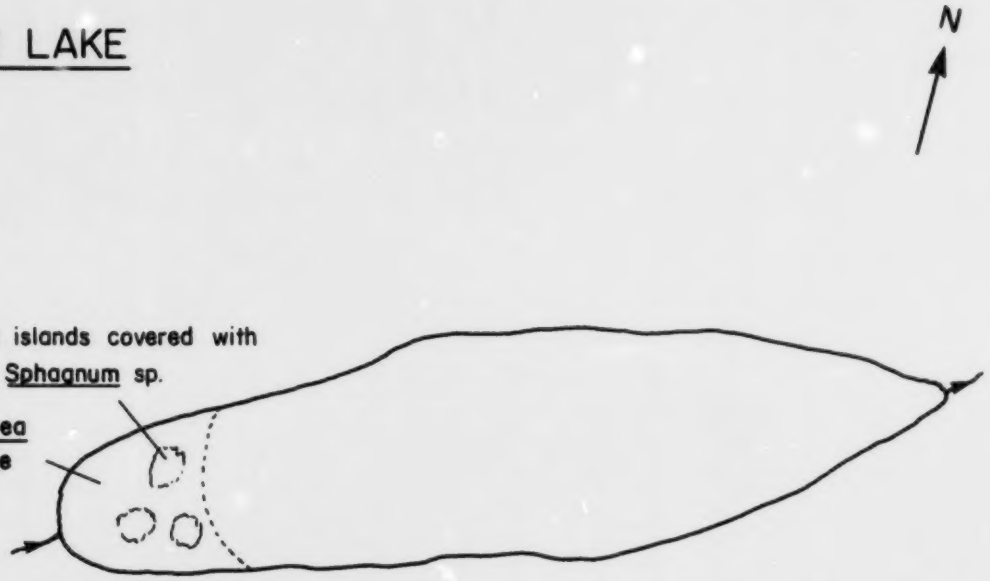

N
- floating organic islands covered with U. cornuta and Sphagnum sp.
- >50% Nymphaea surface coverage
- surveyed entire perimeter of lake
- 100% U. vulgaris coverage (up to 1m thick) from 0 to 5m (maximum depth of plant growth)
- thick clouds of filamentous algae throughout lake
0
m
100
- not drawn exactly to scale

FIG. A-30

Table A30

KRAMER LAKE
(Aug. 20/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

	TRANSECT	1
	DEPTH	0
	ZONE (m)	5.0
	TOTAL	*
Lycopus sp.		x
Nymphaea odorata		x
Utricularia cornuta		x
Utricularia vulgaris		*
Sphagnum cuspidatum		x

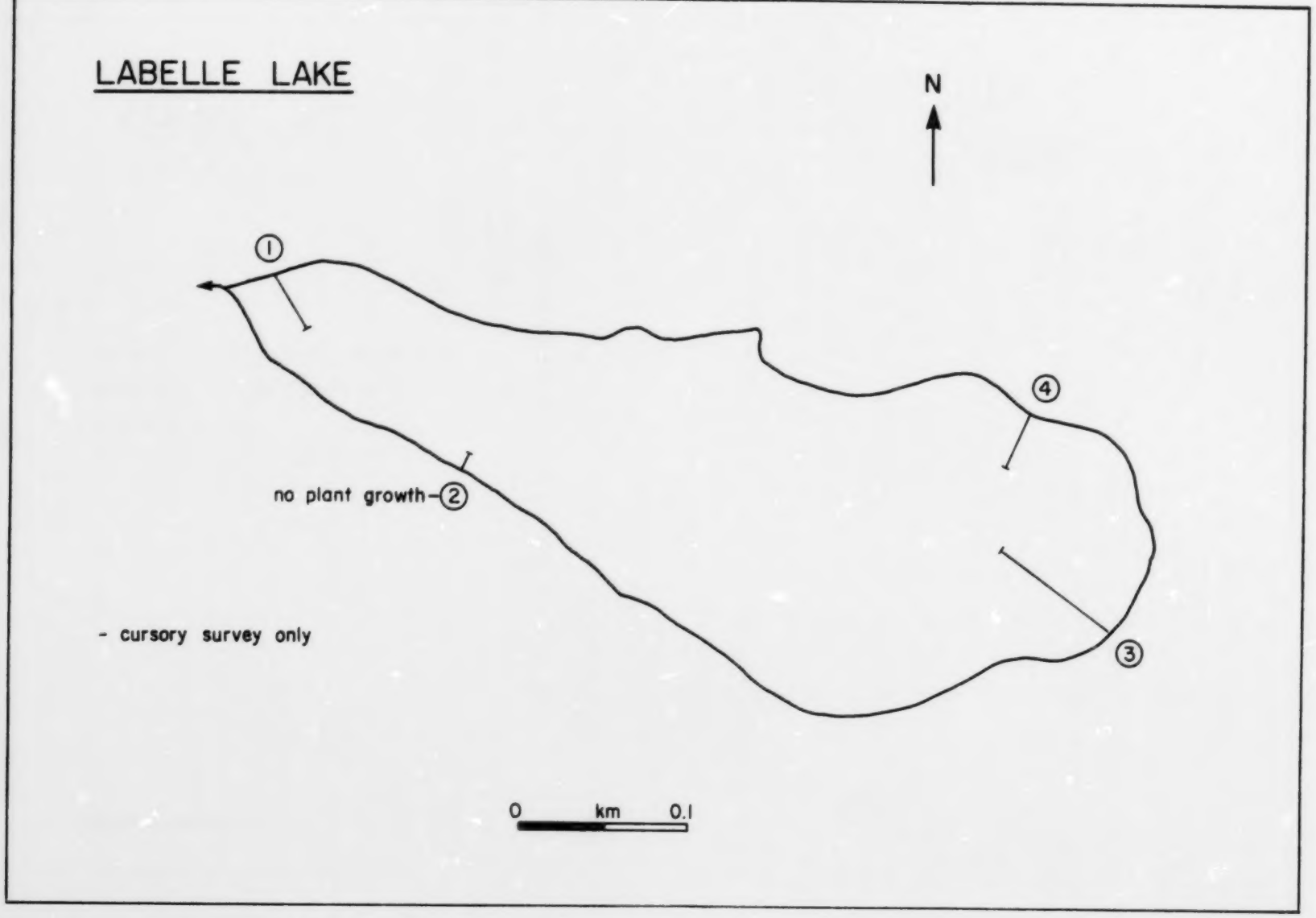

LABELLE LAKE
N
1
2
3
4
no plant growth
- cursory survey only
0
km
0.1

FIG. A-31

Table A31

Bottom Cover - <5% (x), 5-50% (o), >50% (*)
LABELLE LAKE
(July 29/77)

	TRANSECT	1	3	4	
	DEPTH	0	1.5	0	0.5
	ZONE (m)	2.0	3.0	0.5	1.5
	TOTAL	x	x	x	o
Eriocaulon septangulare	1			*	o
Lobelia Dortmanna	1			x	
Myriophyllum Farwellii	1	x			
Potamogeton natans	1			x	
Utricularia cornuta	1			o	
Nitella sp.	2	x	x		

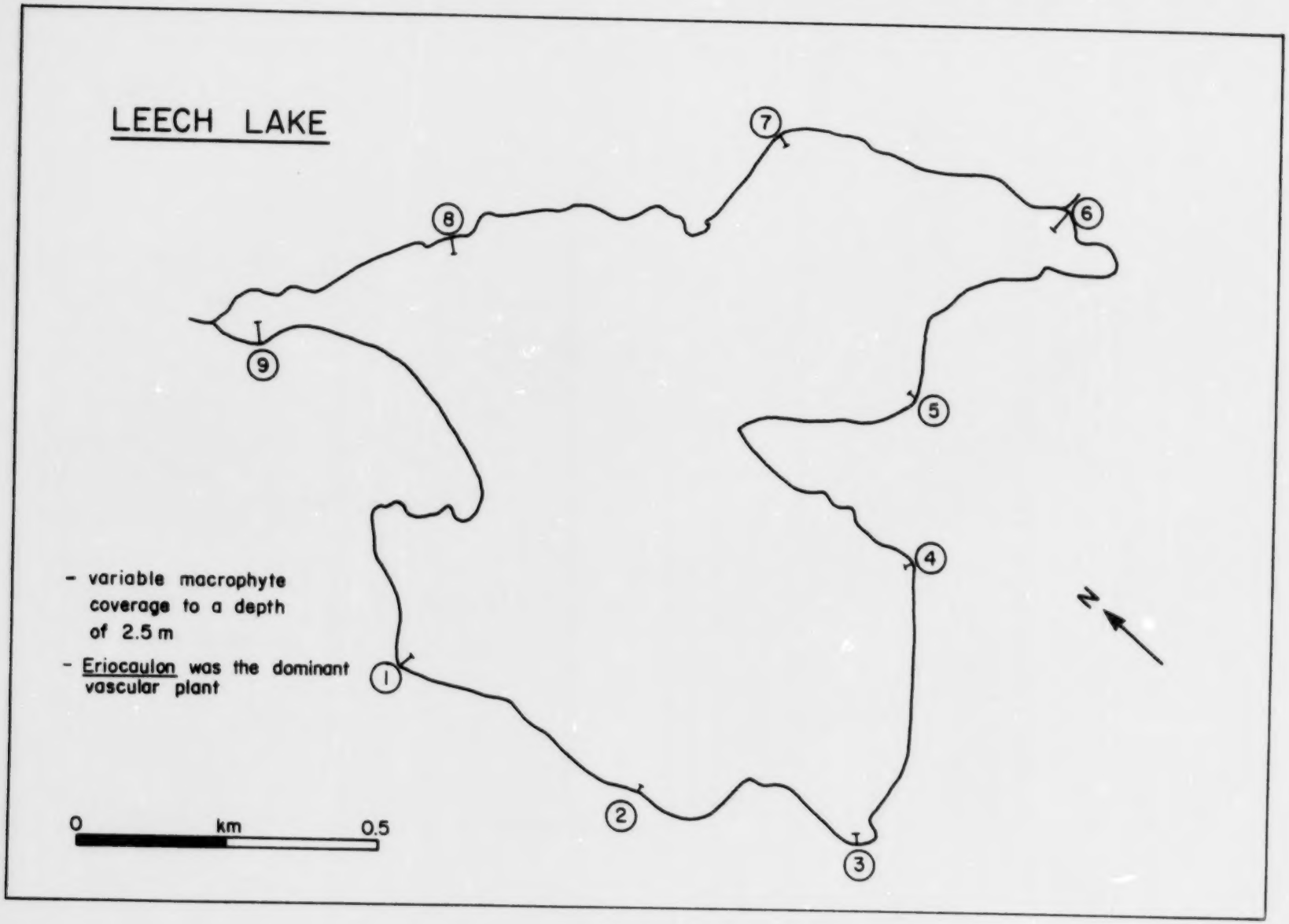

LEECH LAKE
7
8
6
9
5
4
1
2
3
- variable macrophyte coverage to a depth of 2.5 m
- Eriocaulon was the dominant vascular plant
0
km
0.5
N

FIG. A-32

LEECH LAKE
(May 6/78)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

	TRANSECT	1	2	3	4	5	6		7		8		9
	DEPTH	0	0	0	0	0	0	1.5	0	1.0	0	1.0	0
	ZONE (m)	2.5	1.5	1.0	2.0	1.5	1.5	2.0	1.0	2.0	1.0	2.0	1.0
	TOTAL	o	o	*	x	o	*	o	o	x	o	x	o
Elatine minima	4					x	o		x		x	x	
Eleocharis acicularis	3						x				x		o
Eriocaulon septangulare	8	o	o		x	x	x		o		x		o
Isoetes sp.	7	x	x		x	o	x			x	x	x	
Juncus pelocarpus	2						x				x		
Lobelia Dortmanna	1						x						
Lycopus sp.	3	x		x			x						
Myriophyllum tenellum	2						x				x		
Nuphar variegatum	5	x	x	x		x							x
Pontederia cordata	3	x							x				x
Potamogeton epihydrus	2						x						x
Sparganium sp.	2	x					x	x					
Utricularia resupinata	1						o	o					
Utricularia vulgaris	1			x									
Nitella flexilis	1						x						
Drepanocladus sp.	2			*			o						
Fontinalis antipyretica	5	o		x			o	x	o	x			o

Table A32

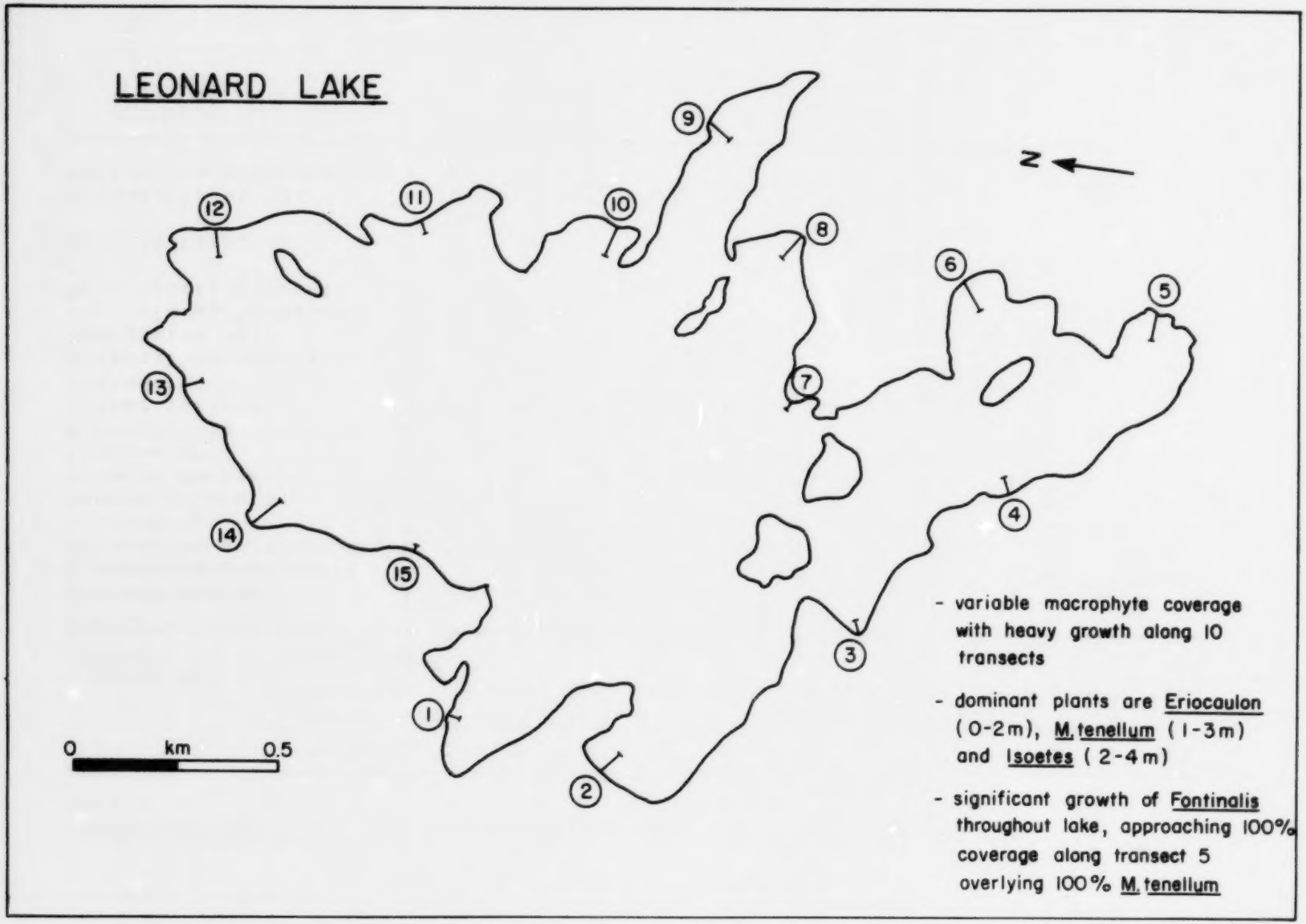

LEONARD LAKE
N
0
km
0.5
- variable macrophyte coverage with heavy growth along 10 transects
- dominant plants are Eriocaulon (0-2m), M. tenellum (1-3m) and Isoetes (2-4m)
- significant growth of Fontinalis throughout lake, approaching 100% coverage along transect 5 overlying 100% M. tenellum

FIG. A-33

EONARD LAKE
July 5/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

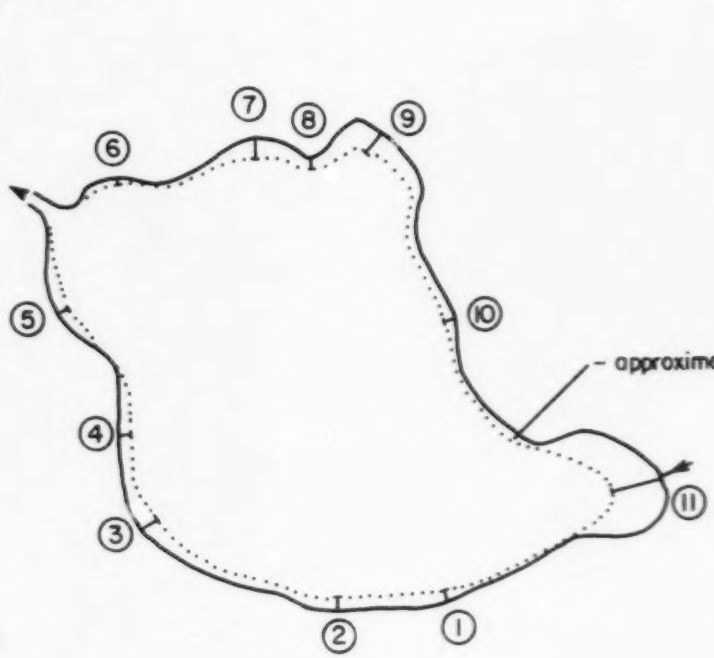
TRANSECT		1		2				3			4		5		6			7	
DEPTH		0	2.5	0	0.6	2.0	3.5	0	2.0	2.5	0.5	2.0	0	2.0	0	2.0	3.0	0	2.0
ZONE (m)		2.5	3.5	0.6	2.0	3.5	4.0	2.0	2.5	3.0	2.0	3.5	2.0	3.5	2.0	3.0	3.5	2.0	3.5
TOTAL		*	*	o	*	*	o	*	*	o	*	*	*	*	*	*	o	o	o
latine minima	1																	x	
leocharis acicularis	4			x											o				
riocaulon septangulare	14	*		o	*			*			o		o		*			o	
soetes sp.	15		o			o	o		o	o		o	o	o		o	o	o	o
uncus pelocarpus	4			x														x	
obelia Dortmanna	10	x			x						x							o	
ycopus sp.	1																		
yriophyllum tenellum	11		o		o	o		o	o				*	o		*		x	
aphar variegatum	3																		
ymphoides cordatum	1										x								
ontederia cordata	5			x															
otamogeton Oakesianus	1												x						
parganium sp.	3	x																	
tricularia purpurea	2											o		o					
tricularia resupinata	6		x						*						o	x			
ontinalis antipyretica	10	x		x							o	o	*	o	o			x	
phagnum sp.	3	x		x															

Table A33

LEONARD LAKE (Cont'd.)
July 5/79)

TRANSECT		8				9		10				11		12		13		14		15
DEPTH		0	0.5	1.5	2.0	0	1.5	0	1.0	2.0	2.5	2.0	0	2.0	2.5	0	1.8	0	1.5	0
ZONE (m)		0.5	1.5	2.0	4.0	1.5	3.0	1.0	2.0	2.5	4.0	2.5	2.0	2.5	4.0	1.8	3.5	1.5	3.0	2.0
TOTAL		x	*	*	o	*	*	x	*	o	o	x	*	o	o	o	o	o	x	o
Elatine minima	1																			
Eleocharis acicularis	4					x										x				
Eriocaulon septangulare	14	x	*	o		*		x	*				x			o		o		o
Isoetes sp.	15				o	x	*			o	o	x	x	o	o	x	o	x	x	x
Juncus pelocarpus	4		x													x				
Lobelia Dortmanna	10	x	o			o		x	x				x			x				o
Lycopus sp.	1	x	x																	
Myriophyllum tenellum	11			*			x	x	x	o			x	o						x
Nuphar variegatum	3					x							x					x		
Nymphoides cordatum	1																			
Pontederia cordata	5	x	x						x				x					x		
Potamogeton Oakesianus	1																			
Sparganium sp.	3	x	x										x							
Utricularia purpurea	2																			
Utricularia resupinata	6					o	x								x	x	x			
Fontinalis antipyretica	10	x	o	o	o	x	x						*	x	x		x			
Sphagnum sp.	3	x	x																	

LITTLE CLEAR LAKE



- variable macrophyte growth throughout lake to a maximum depth of 2 m
- Eriocaulon was the dominant plant

FIG. A-34

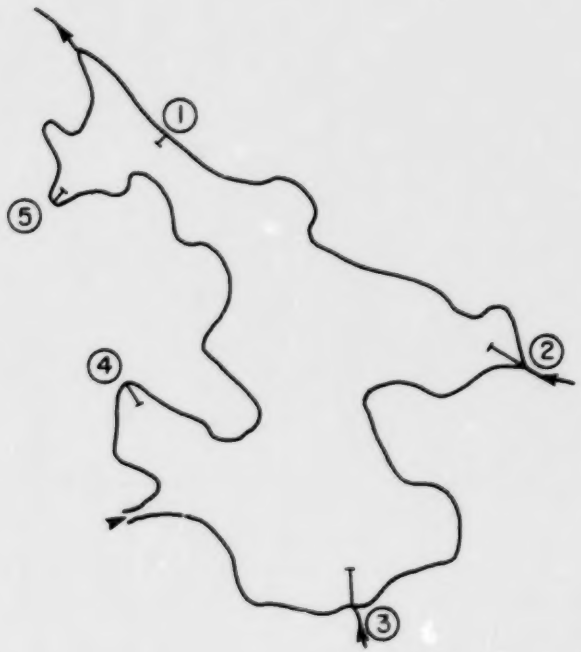
LITTLE CLEAR LAKE (July 25/78)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1		2	3		4	5	6	7		8		9	10	11
DEPTH ZONE (m)		0 1.5	1.5 2.0	0 1.0	0 0.5	0.5 1.5	0 1.5	0 0.5	0 1.0	0 1.3	1.3 1.6	0 1.5	1.5 1.7	0 1.5	0 0.5	0 1.2
TOTAL		*	x	o	*	o	o	x	o	o	x	o	x	*	o	*
Eleocharis acicularis	3			o		x								x		x
Eriocaulon septangulare	11	o		o	*	o	o	x	o	o		o		*	o	o
Isoetes sp.	9			x		x	x	x		x	x	x	x	x	x	o
Juncus pelocarpus	1															x
Lobelia Dortmanna	3											o		o		x
Lycopus sp.	3					x	x							x		
Myriophyllum tenellum	2										x		x			
Nuphar variegatum	9			x	x			x	x	x		x		x	x	x
Pontederia cordata	4				x									x	x	x
Potamogeton epihydrus	2													x		o
Sparganium sp.	1					x										
Utricularia purpurea	8	o	x		o	o	x			x		x		x	x	o
Utricularia vulgaris	2	o	x													x
Vallisneria americana	2													x		*
Nitella flexilis	1															x
Fontinalis antipyretica	5	o	x	x			x								x	o

Table A34

LITTLE OTTER LAKE



- variable macrophyte growth throughout lake to a maximum depth of 4 m
- very heavy Elodea growth at mouths of inflowing streams

- not drawn to scale

FIG. A-35

LITTLE OTTER LAKE Bottom Cover - <5% (x), 5-50% (o), >50% (*)
(July 5/79)

	TRANSECT	1			2		3		4	5	
	DEPTH	0	2.0	3.0	0	2.0	0.5	1.0	0	0	2.0
	ZONE (m)	0.5	3.0	3.8	2.0	4.0	1.0	3.5	2.0	2.0	4.0
	TOTAL	x	x	x	*	x	*	x	o	o	o
Callitriche sp.	1				x						
Elatine minima	1				x						
Eleocharis acicularis	5	x			o		x		x	o	
Elodea sp.	4	x	x	x	o	x	o	x		o	o
Eriocaulon septangulare	2				x					o	
Isoetes sp.	4		x		o	x	o				x
Juncus militaris	1				x						
Juncus pelocarpus	1				o						
Lobelia Dortmanna	1				x						
Lycopus sp.	2				x		x				
Najas flexilis	2		x		x						
Nymphaea odorata	4		x		x				o	o	
Pontederia cordata	5	x			x		x		x	x	
Potamogeton epihydrus	4				x		x		x	x	x
Potamogeton Robbinsii	5		x		x		x		x	x	o
Potamogeton Vaseyi	3						o		x	x	
Ranunculus reptans	1				x						
Sagittaria sp.	4		x		o	x	o		x		
Utricularia purpurea	1									x	
Utricularia vulgaris	2				x					x	
Vallisneria americana	2		x							x	o
Nitella furcata	1									x	o
Nitella tenuissima	1									x	o
Fontinalis antipyretica	4				x		x		x	x	
Fontinalis duriaei	1				x						

Table A35

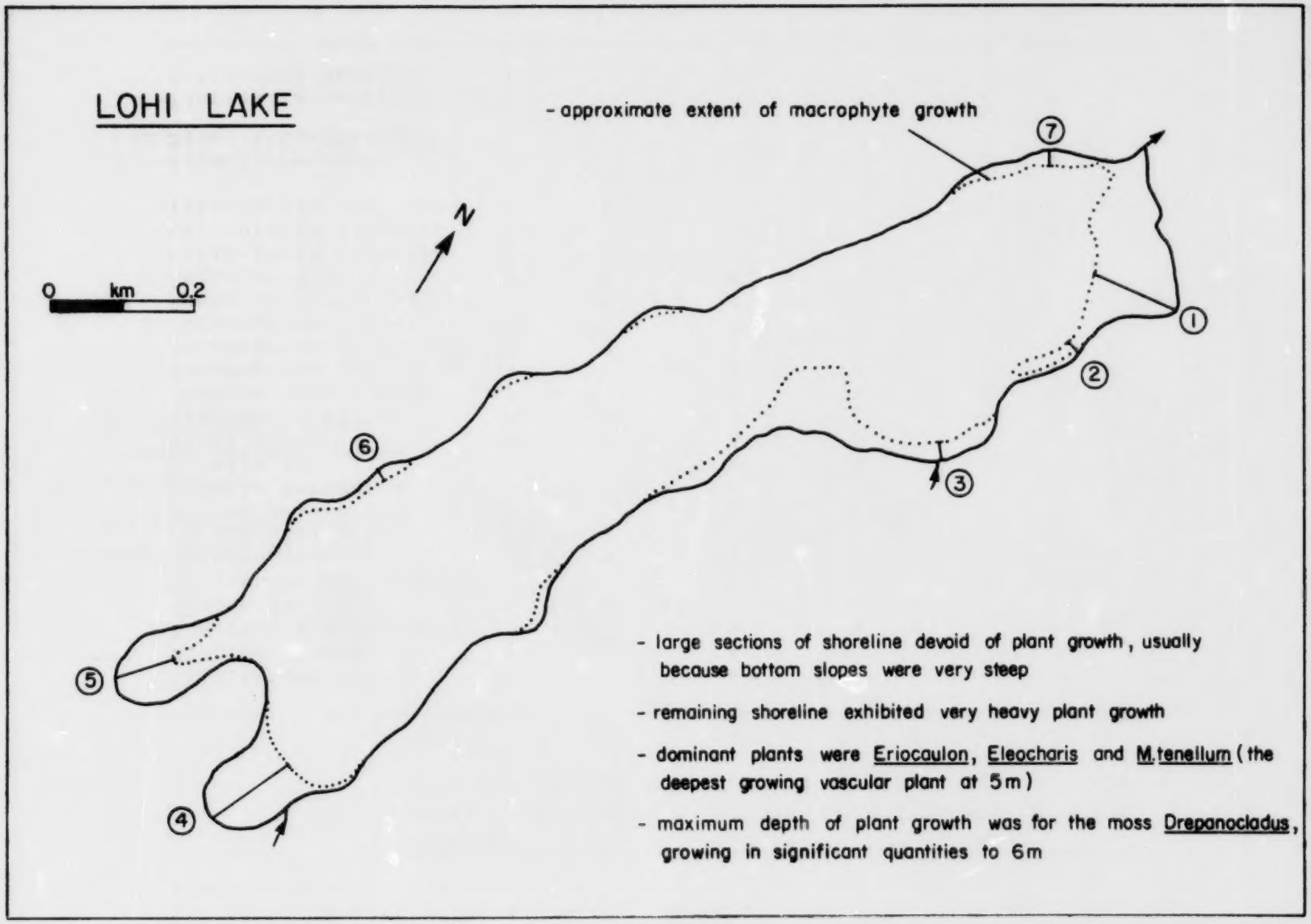

LOHI LAKE
- approximate extent of macrophyte growth
N
0 km 0.2
1
2
3
4
5
6
7
- large sections of shoreline devoid of plant growth, usually because bottom slopes were very steep
- remaining shoreline exhibited very heavy plant growth
- dominant plants were Eriocaulon, Eleocharis and M.tenellum (the deepest growing vascular plant at 5m)
- maximum depth of plant growth was for the moss Drepanocladus, growing in significant quantities to 6m

FIG. A-36

LOHI LAKE
(July 19/78)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1				2		3	4			5			6		7
DEPTH		0	0.5	1.5	4.0	0.5	2.0	0	0	1.0	2.0	0	1.0	2.0	0.5	2.0	0.5
ZONE (m)		0.5	1.5	4.0	6.0	2.0	6.0	2.5	1.0	2.0	5.0	1.0	2.0	5.0	2.0	6.0	2.5
TOTAL		*	*	*	o	*	*	*	*	*	*	o	*	*	*	x	*
Eleocharis acicularis	3	o	x						o	o		o	o				
Eleocharis Robbinsii	1	o	x														
Eriocaulon septangulare	7	o	o			*		*	o	o		o	o		*		*
Juncus pelocarpus	4	o						x	o			x					
Myriophyllum tenellum	2										*			*			
Utricularia vulgaris	2								x	x		x	x				
Drepanocladus sp.	5	o	o	*	o		*		x		x	x	o			x	

Table A36

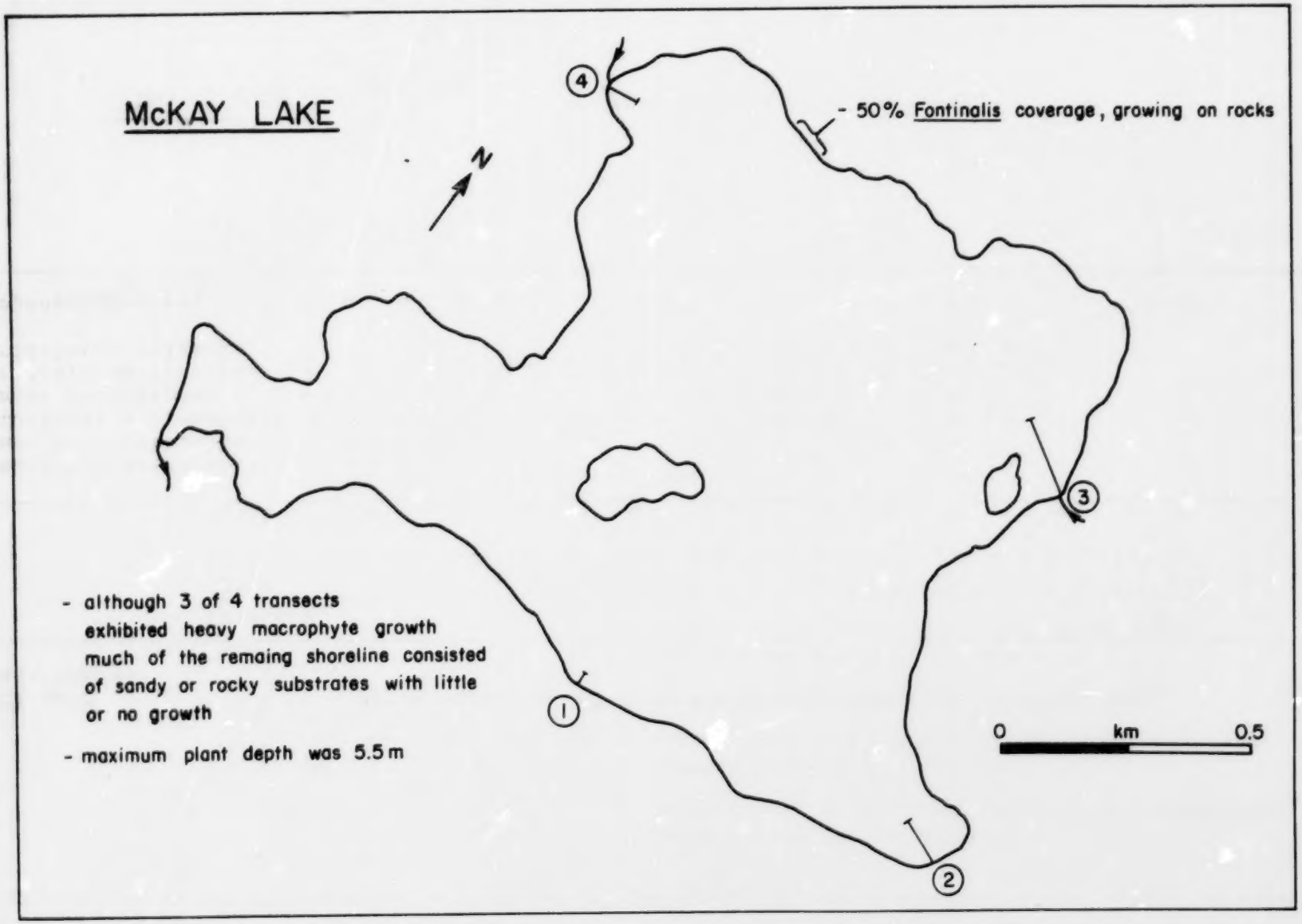

McKAY LAKE
N
- 50% Fontinalis coverage, growing on rocks
- although 3 of 4 transects exhibited heavy macrophyte growth much of the remaing shoreline consisted of sandy or rocky substrates with little or no growth
- maximum plant depth was 5.5 m
0
km
0.5
1
2
3
4

FIG. A-37

Table A37

McKAY LAKE (June 19/79) Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1		2		3			4	
DEPTH		0	1.0	0	1.5	0	0.5	2.0	0	1.5
ZONE (m)		1.0	2.0	1.5	2.5	0.5	2.0	5.5	1.5	4.0
	TOTAL	o	x	*	x	*	*	x	*	x
Brasenia Schreberi	1								x	
Eleocharis acicularis	3			x	x		o		x	
Eleocharis Robbinsii	1					o				
Eriocaulon septangulare	4	o		x		o	o		o	
Isoetes sp.	2	x	x		x					
Juncus militaris	1					x				
Juncus pelocarpus	3			x		x	x		x	
Lobelia Dortmanna	2			x		x				
Lycopus sp.	1								x	
Myriophyllum tenellum	2			*	x		*	x		
Nuphar variegatum	3	x		x		x	x			
Nymphaea odorata	3			x		x	x		o	
Pontederia cordata	4	x	x	x		x			x	
Potamogeton confervoides	1						x	x		
Potamogeton epihydrus	3			x		o			x	
Potamogeton natans	1								x	
Potamogeton Oakesianus	2			x		x				
Potamogeton pusillus	1					x				
Sagittaria sp.	2						x		o	x
Sparganium sp.	2					x	x		x	x
Utricularia resupinata	2			o			x			
Vallisneria americana	1						x	x		
Nitella flexilis	1							x		
Fontinalis antipyretica	4	x			x		x		x	x
Fontinalis duriaei	1	x								
Fontinalis nova-angliae	2			o		x				
Sphagnum cuspidatum	1					x				
Sphagnum subsecundum platyphyllum	1								x	

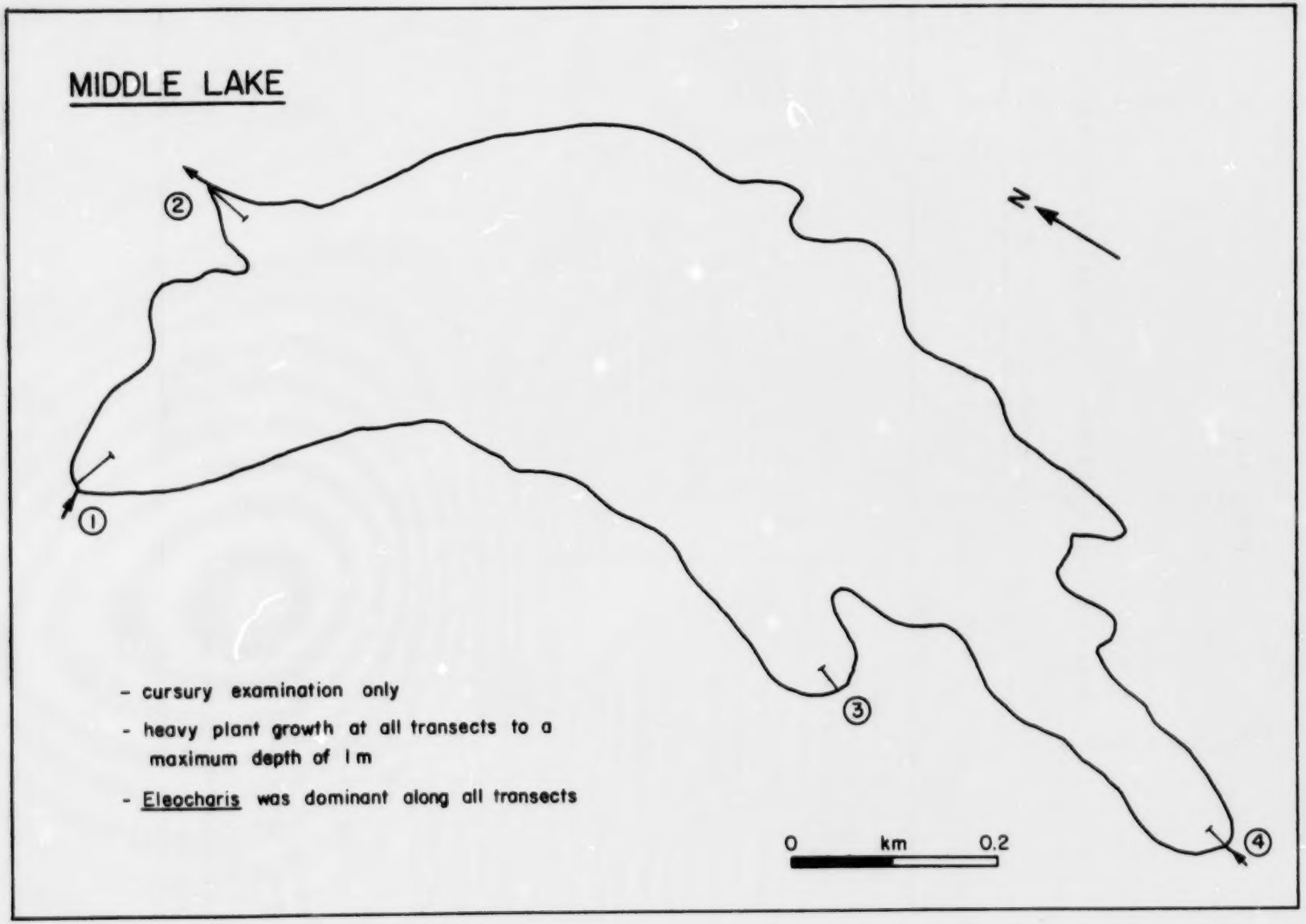

MIDDLE LAKE
N
1
2
3
4
- cursury examination only
- heavy plant growth at all transects to a maximum depth of 1 m
- Eleocharis was dominant along all transects
0
km
0.2

FIG. A-38

Table A38

MIDDLE LAKE
(July 26/77)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1	2	3	4
DEPTH ZONE (m)		0 1.0	0 1.0	0 1.0	0 1.0
TOTAL		*	*	*	*
Eleocharis acicularis	4	*	*	*	*
Eriocaulon septangulare	3	x	x		o
Juncus pelocarpus	4	o	o	x	x
Sagittaria sp.	2	x			x

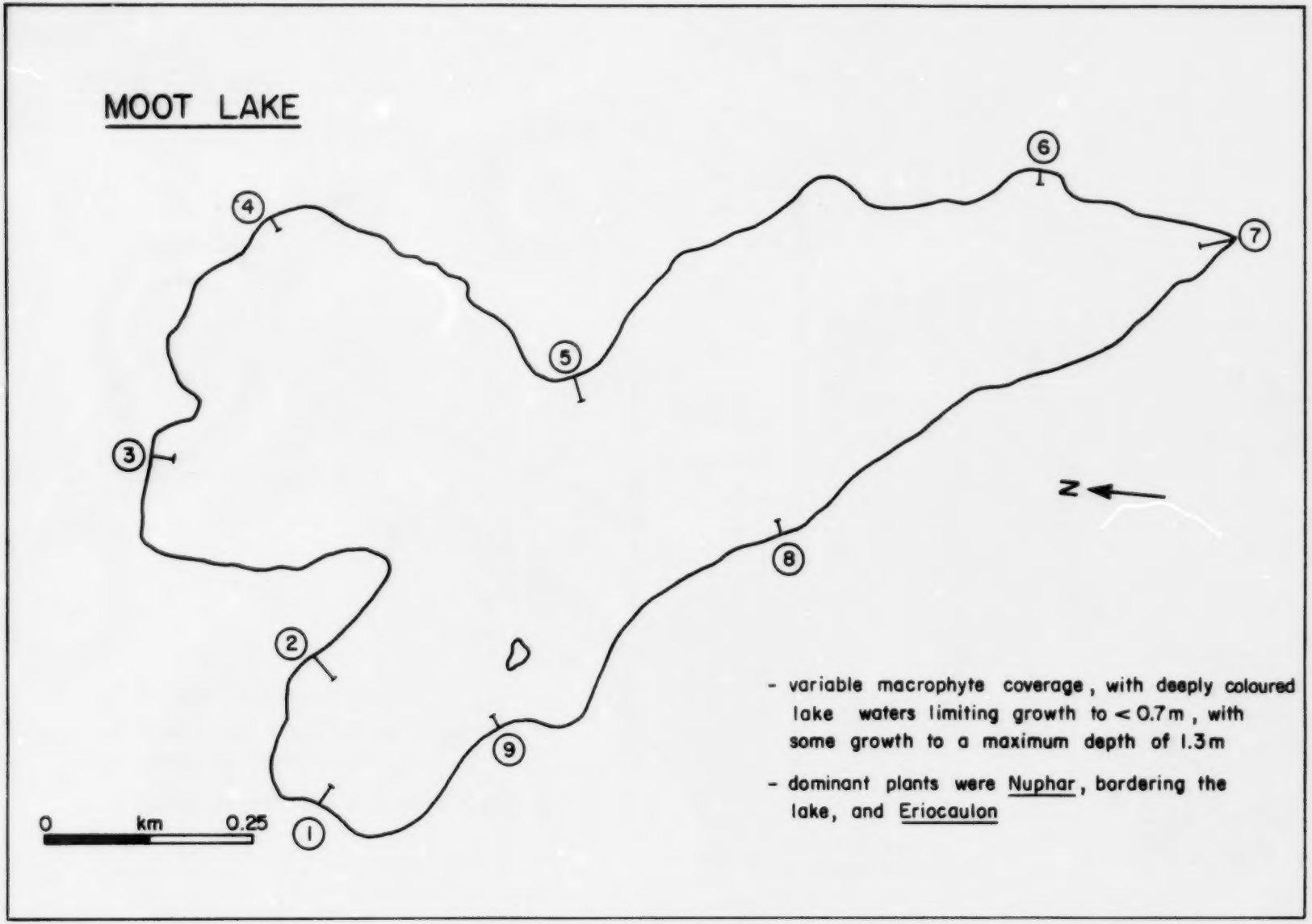

MOOT LAKE
1
2
3
4
5
6
7
8
9
N
0
km
0.25
- variable macrophyte coverage, with deeply coloured lake waters limiting growth to < 0.7 m, with some growth to a maximum depth of 1.3 m
- dominant plants were Nuphar, bordering the lake, and Eriocaulon

FIG. A-39

MOOT LAKE
(July 31/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

	TRANSECT	1	2		3	4	5	6	7	8	9
	DEPTH	0	0	0.7	0.2	0	0	0	0	0	0
	ZONE (m)	1.0	0.7	1.3	0.6	0.4	1.0	0.5	0.8	0.6	0.6
	TOTAL	*	o	x	x	*	o	o	o	o	x
Eleocharis acicularis	2		x			x					
Eleocharis Robbinsii	3	x			x		x				
Eriocaulon septangulare	7		o		x	*	o	o		x	x
Isoetes sp.	3			x				x	x		
Lobelia Dortmanna	3		o			x	x				
Lycopus sp.	3		x		x			x			
Myriophyllum tenellum	1						x				
Nuphar variegatum	6	*			x	x		o		o	x
Pontederia cordata	7	o	x			x		x	x	x	x
Potamogeton bicupulatus	1				x						
Potamogeton epihydrus	4	x	x			x		x			
Sparganium sp.	2		x								x
Utricularia resupinata	1						x				
Utricularia vulgaris	3	x				x				x	
Fontinalis antipyretica	3		x	x				x	o		

Table A39

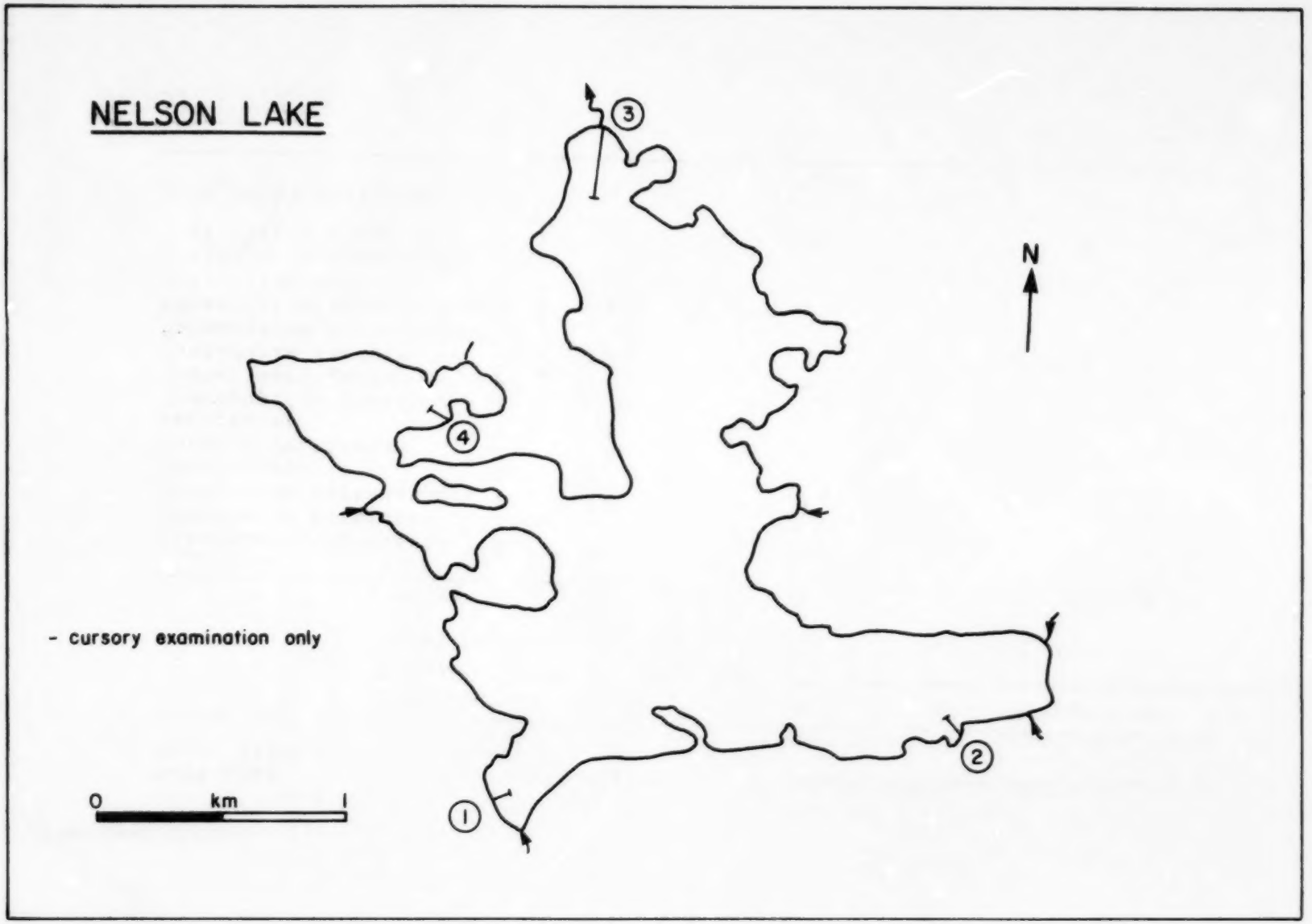


FIG. A-40

Table A40

NELSON LAKE
(July 29/77)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1	2			3		4	
DEPTH ZONE (m)		0 2.0	0 1.5	1.5 2.0	2.0 2.5	0 3.0	3.0 4.5	0 0.8	0.8 1.5
	TOTAL	*	x	o	x	o	*	o	*
Eleocharis acicularis	2								
Eriocaulon septangulare	4	o	x	o		o	o		
Isoetes sp.	2	x		o		o		o	*
Juncus militaris	1				x				
Juncus pelocarpus	1					x			
Lobelia Dortmanna	1	x				o			
Myriophyllum tenellum	2	*							
Sagittaria sp.	1	x				o	o		
Drepanocladus sp.	1					x			x

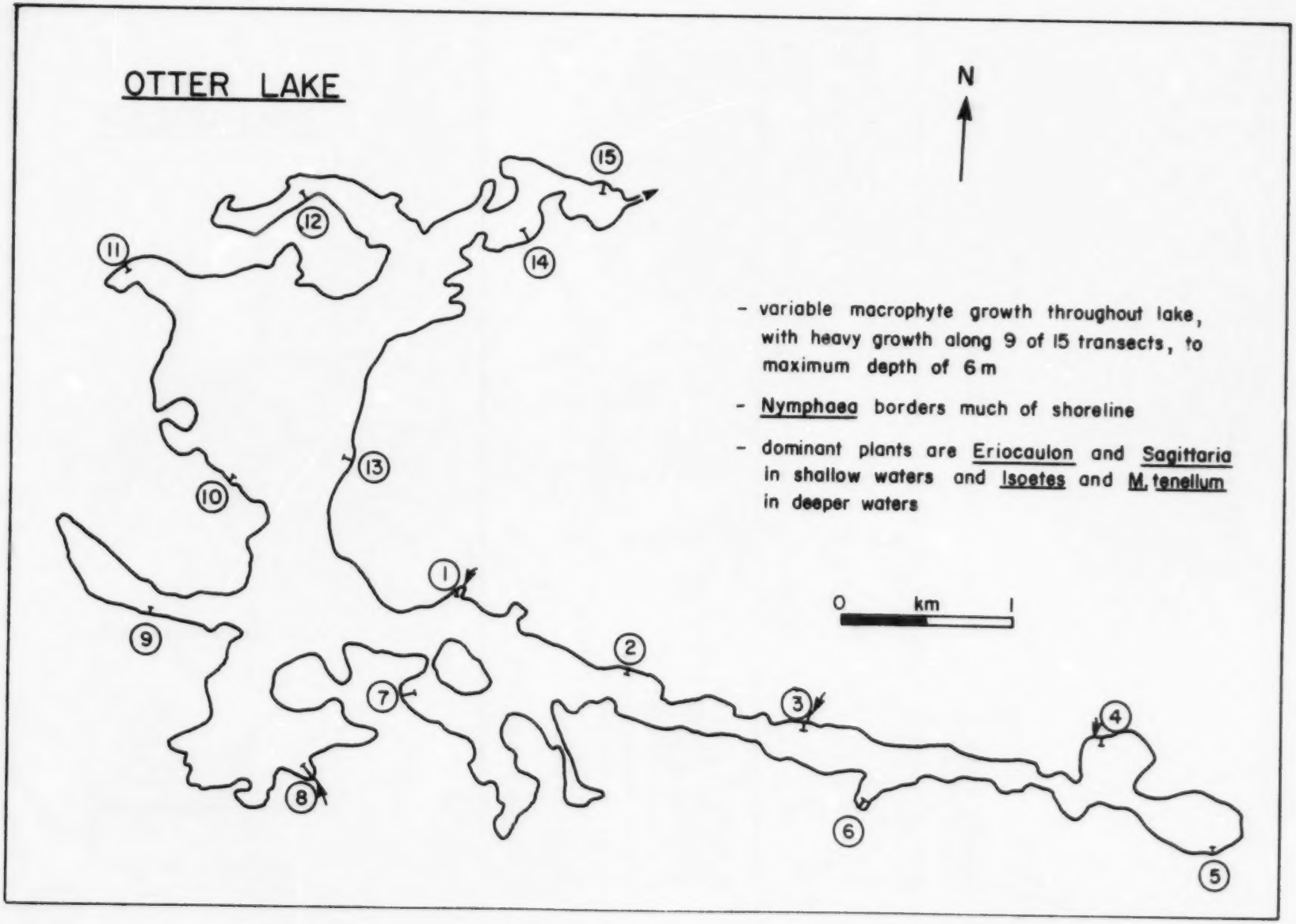

OTTER LAKE
N
- variable macrophyte growth throughout lake, with heavy growth along 9 of 15 transects, to maximum depth of 6 m
- Nymphaea borders much of shoreline
- dominant plants are Eriocaulon and Sagittaria in shallow waters and Isoetes and M. tenellum in deeper waters
0 km 1
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

FIG. A-41

OTTER LAKE
(July 3/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1		2		3		4		5		6	7		
DEPTH ZONE (m)		0 2.0	2.0 3.0	0 2.0	2.0 6.0	0 2.0	2.0 4.0	0 2.0	2.0 4.5	0 2.0	2.0 4.5	0 1.0	0 2.0	2.0 3.0	3.0 5.0
TOTAL		o	o	o	o	*	o	*	o	*	*	x	*	o	x
Elatine minima	1														
Eleocharis acicularis	7	o				x									
Eleocharis Robbinsii	2					x		o		o			o		
Eriocaulon septangulare	14	o		o		o		o		o					
Isoetes sp.	14	o			o	o	o	o	o	o	*		o	o	
Juncus pelocarpus	6	x				o		o		o			o		x
Lobelia Dortmanna	5	x				x		x		o			o	x	
Lycopus sp.	5	x	o				x			x			x		
Myriophyllum tenellum	10			o		o	x								
Nuphar variegatum	3	x		o		x		o			o		o		
Nymphaea odorata	13			x			o	o				x	x		
Pontederia cordata	8			x			o			o					
Potamogeton Berchtoldii	2	x	x							x			x		
Potamogeton capillaceus	2														
Potamogeton epihydrus	3					x							x	x	
Potamogeton natans	1					o		o					x		
Ranunculus reptans	2					o	x	x							
Sagittaria sp.	11	o				o		x					o		
Sparganium sp.	10	x				x		x				x	x		
Utricularia intermedia	2	x				x				x					
Utricularia purpurea	2							x							
Utricularia resupinata	6					x		o		x			x		
Utricularia vulgaris	3	x				x		x							
Nitella furcata	3	o	o												
Nitella tenuissima	2					x									
Fontinalis antipyretica	5	o	x					x							
Sphagnum subsecundum contortum	2	x								x		x			
Sphagnum subsecundum platyphyllum	2											x			

Table A41

OTTER LAKE (Cont'd.)
(July 3/79)

TRANSECT		8		9		10		11	12	13		14		15	
DEPTH		0	2.0	0	1.0	0	3.0	0	0	1.0	2.0	0	1.5	0	2.0
ZONE (m)		2.0	3.5	1.0	4.0	3.0	5.0	3.0	3.5	2.0	5.5	1.5	3.0	2.0	4.0
TOTAL		*	x	o	x	*	*	*	*	*	o	o	o	o	o
Elatine minima	1														
Eleocharis acicularis	7	o							x						
Eleocharis Robbinsii	2	x							o						
Eriocaulon septangulare	14	o		x		o		*	o	o		o		o	
Isoetes sp.	14	o	x	x	x	x	o	o	o	o	o		x		o
Juncus pelocarpus	6	x							o						
Lobelia Dortmanna	5								x						
Lycopus sp.	5	x		x				x							
Myriophyllum tenellum	10	x				x	o	o	o	o		x	o		
Nuphar variegatum	3														
Nymphaea odorata	13	x		x		x		x	x	x		o		x	
Pontederia cordata	8	x		x		x		x				x		x	
Potamogeton Berchtoldii	2	x													
Potamogeton capillaceus	2	o													
Potamogeton epihydrus	3	x		x											
Potamogeton natans	1														
Ranunculus reptans	2														
Sagittaria sp.	11	o				o		x	o	o		o		x	
Sparganium sp.	10	x				x		x					x	x	
Utricularia intermedia	2							x							
Utricularia purpurea	2								o						
Utricularia resupinata	6	x						x							
Utricularia vulgaris	3	x													
Nitella furcata	3	o													
Nitella tenuissima	2	x													
Fontinalis antipyretica	5	x		o											
Sphagnum subsecundum contortum	2			x											
Sphagnum subsecundum platyphyllum	2							x							

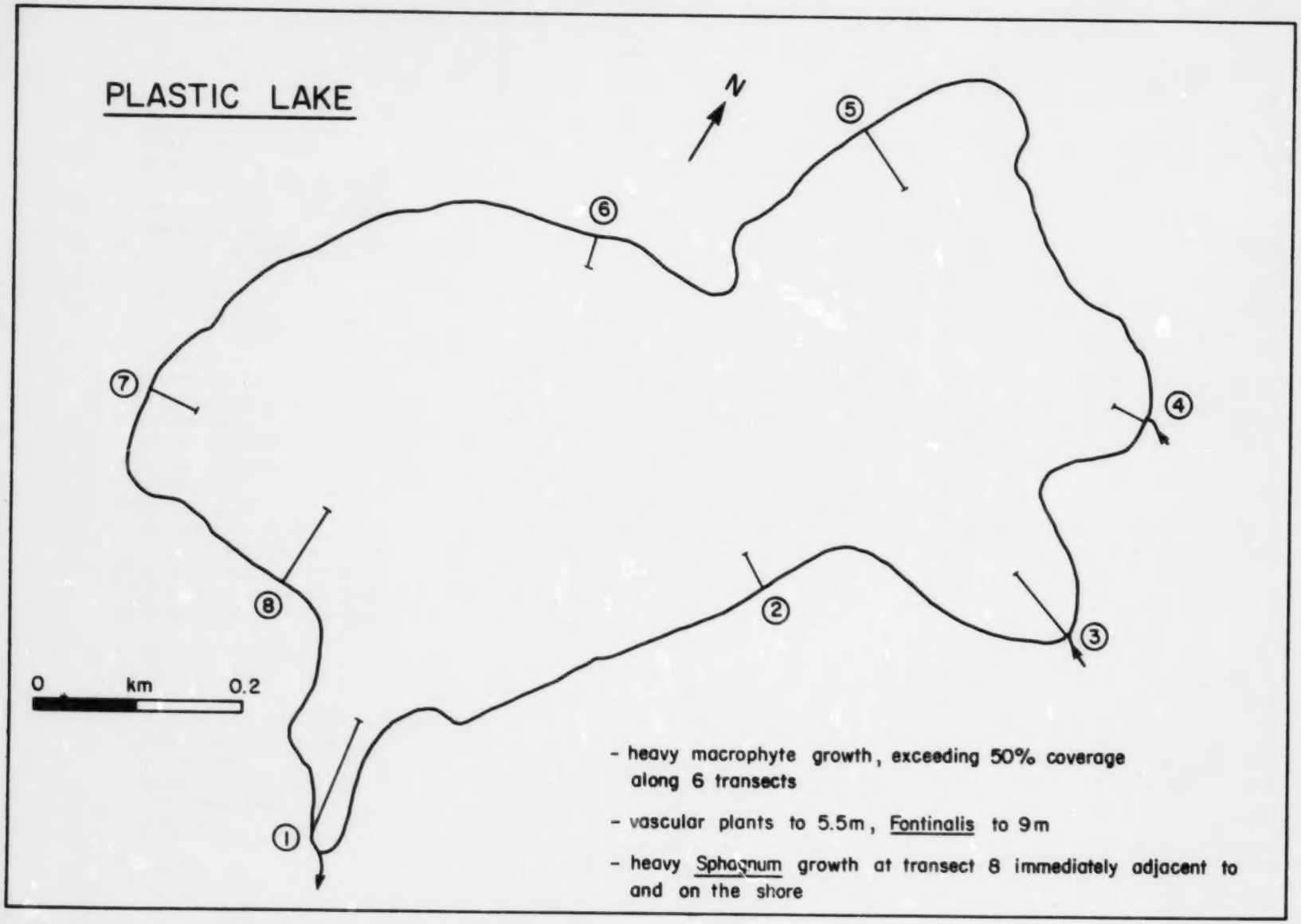

PLASTIC LAKE
N
1
2
3
4
5
6
7
8
0
km
0.2
- heavy macrophyte growth, exceeding 50% coverage along 6 transects
- vascular plants to 5.5m, Fontinalis to 9m
- heavy Sphagnum growth at transect 8 immediately adjacent to and on the shore

FIG. A-42

PLASTIC LAKE
(Aug. 2/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

	TRANSECT	1				2[1]			3				4		
	DEPTH	0	1.2	2.7	4.0	1.0	2.2	4.0	0	1.5	2.0	3.0	0	1.4	2.3
	ZONE (m)	1.2	2.7	4.0	5.5	2.2	4.0	4.5	1.5	2.0	3.0	4.5	1.4	2.3	3.5
	TOTAL	o	*	*	*	*	*	o	*	o	o	o	x	o	x
Elatine minima	3					x									
Eleocharis acicularis	1														
Eriocaulon septangulare	8	x	x			o			x	o			x	x	
Isoetes sp.	8	x	o			o	o	o			o	o		x	
Juncus militaris	2					x									
Lobelia Dortmanna	4					o									
Myriophyllum tenellum	4					o	o								
Nuphar variegatum	2								x						
Nymphaea odorata	4									x			x		
Pontederia cordata	4	x							x	x			x		
Potamogeton epihydrus	1												x		
Sparganium sp.	3	x											x		
Utricularia purpurea	6		*	*		x				x	x				
Utricularia resupinata	6	x				o	o								
Utricularia vulgaris	5	x	x			x			x				x	x	
Nitella tenuissima	2		x	o	*									x	x
Fontinalis antipyretica	5									*	o	x		x	
Sphagnum subsecundum platyphyllum	1														

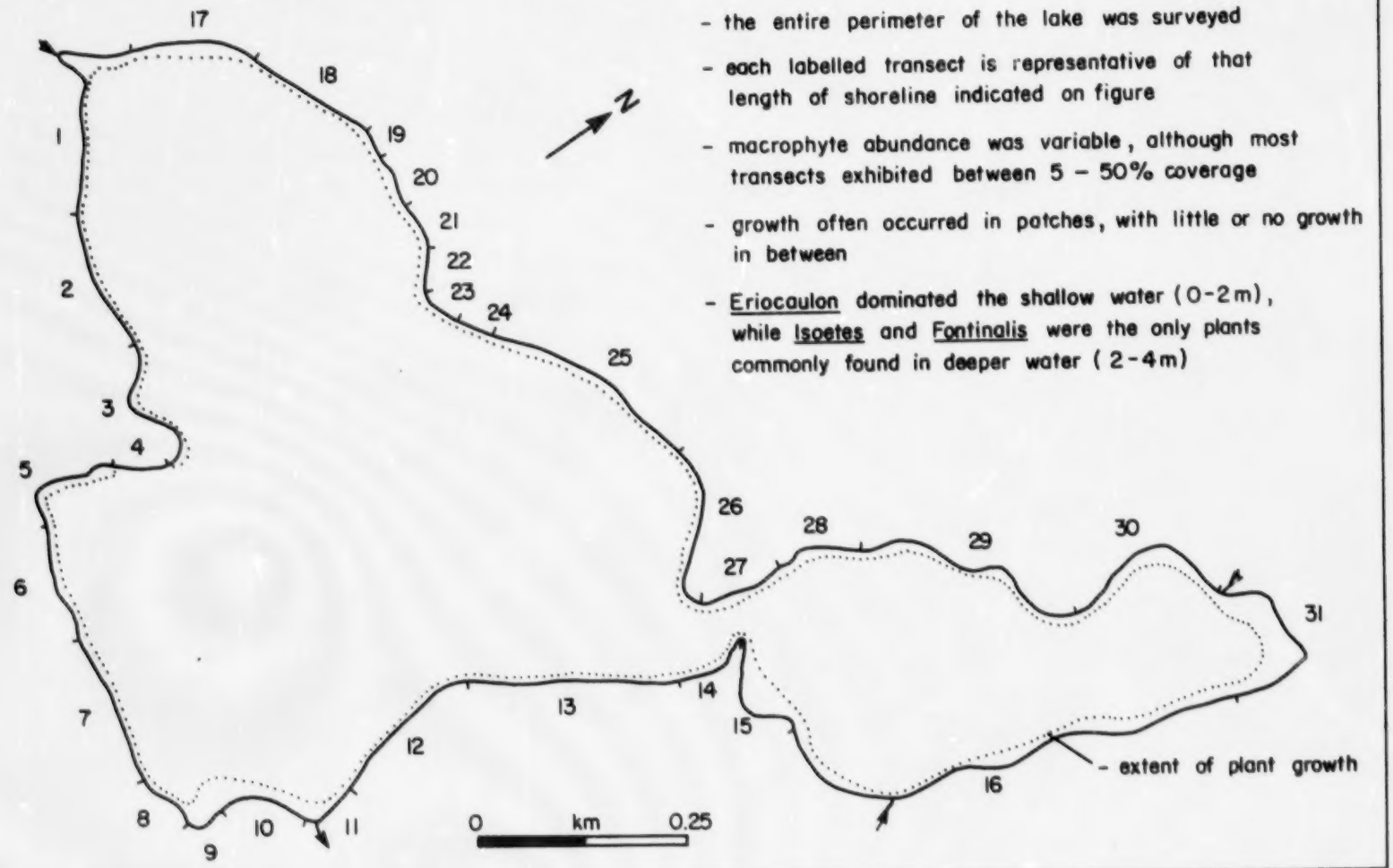
[1] There were no plants in missing depth intervals

Table A42

PLASTIC LAKE (Cont'd.)
(Aug. 2/79)

	TRANSECT	5				6		7			8			
	DEPTH	0	2.0	3.0	5.5	1.0	2.5	0	2.0	2.5	0	1.0	2.5	5.1
	ZONE (m)	2.0	3.0	5.5	9.0	1.9	4.7	2.0	2.5	3.5	1.0	2.5	5.1	6.8
	TOTAL	*	*	*	x	o	o	o	*	x	o	*	*	o
Elatine minima	3					x		x						
Eleocharis acicularis	1										o	o		
Eriocaulon septangulare	8	*				o		o			x	o		
Isoetes sp.	8	x	o	*		x	o		o	x	x	o	o	
Juncus militaris	2											x		
Lobelia Dortmanna	4	x						x				x		
Myriophyllum tenellum	4		o						*			o	*	
Nuphar variegatum	2										x			
Nymphaea odorata	4	x						x						
Pontederia cordata	4										x			
Potamogeton epihydrus	1										x			
Sparganium sp.	3											x	o	
Utricularia purpurea	6	x						x						
Utricularia resupinata	6	o	o			o		x	x		x	o	o	
Utricularia vulgaris	5					x					x	x		
Nitella tenuissima	2													
Fontinalis antipyretica	5	x	x	x	x			o	x		o	o	x	o
Sphagnum subsecundum platyphyllum	1										x			

RED CHALK LAKE



- the entire perimeter of the lake was surveyed
- each labelled transect is representative of that length of shoreline indicated on figure
- macrophyte abundance was variable, although most transects exhibited between 5 – 50% coverage
- growth often occurred in patches, with little or no growth in between
- Eriocaulon dominated the shallow water (0-2m), while Isoetes and Fontinalis were the only plants commonly found in deeper water (2-4m)

- extent of plant growth

FIG. A-43

RED CHALK LAKE
(May 31/78)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1	2	3	5	6	7	8	9[1]	10[1]	11	12	13
DEPTH ZONE (m)		0 1.5	0 1.5	0 1.0	0 1.0	1.0 1.5	0 1.0	0 1.6	0.5 2.0	0.4 1.0	0 2.0	0 0.5	0 1.0
TOTAL		*	x	*	o	*	o	o	o	o	o	o	o
Eleocharis acicularis	1												
Eriocaulon septangulare	29	*		*	o	*	o	o	o	o	o	o	o
Isoetes sp.	8												
Juncus pelocarpus	4											x	
Lobelia Dortmanna	17	x				x		x	o	x	o	x	o
Myriophyllum tenellum	7	x						x	x		x		
Nuphar variegatum	13	x	x		x		x						
Nymphaea odorata	1	x											
Sparganium sp.	4	x	x	x	x								
Utricularia purpurea	1												
Utricularia vulgaris	1												
Fontinalis antipyretica	12	x			o								

[1] There were no plants in the missing depth intervals

Table A43

RED CHALK LAKE (Cont'd.)
(May 31/79)

TRANSECT		14	15	16[1]	17		18		19		20		21	22	
DEPTH		0	0	0.5	0	0.8	0	1.5	0	2.0	0	2.0	0	0	2.0
ZONE (m)		1.0	2.0	1.0	0.8	4.0	1.5	4.0	2.0	4.0	2.0	4.0	2.0	2.0	4.0
TOTAL		o	o	o	*	x	o	x	*	x	o	x	x	x	o
Eleocharis acicularis	1														
Eriocaulon septangulare	29	o	o	o	*		o		o		o		x	x	
Isoetes sp.	8				x	x	x	x			x	x			o
Juncus pelocarpus	4	x							x	x					
Lobelia Dortmanna	17	x			x		x				x				
Myriophyllum tenellum	7						x				x				
Nuphar variegatum	13		x				x				x		x	x	
Nymphaea odorata	1														
Sparganium sp.	4														
Utricularia purpurea	1														
Utricularia vulgaris	1														
Fontinalis antipyretica	12			x	x	x	x	x	o		x	x	x	x	x

RED CHALK LAKE (Cont'd.)
(May 31/78)

TRANSECT		23	24		25		26		27	28	29	30	31	
DEPTH		0	0.5	1.5	0.5	1.5	0.5	2.0	0.5	0	0	0	0	1.0
ZONE (m)		1.5	1.5	3.5	1.5	4.0	2.0	4.0	1.5	1.5	1.5	1.5	1.0	2.5
TOTAL		*	o	x	*	x	*	x	o	o	o	o	o	o
Eleocharis acicularis	1												x	
Eriocaulon septangulare	29	*	o		*		*		o	o	o	o	o	x
Isoetes sp.	8			x				x			x			x
Juncus pelocarpus	4						x							
Lobelia Dortmanna	17	x			o		o				x		x	
Myriophyllum tenellum	7													x
Nuphar variegatum	13								x	x	x	x		
Nymphaea odorata	1													
Sparganium sp.	4													
Utricularia purpurea	1													x
Utricularia vulgaris	1												x	
Fontinalis antipyretica	12				x	x					x	x		

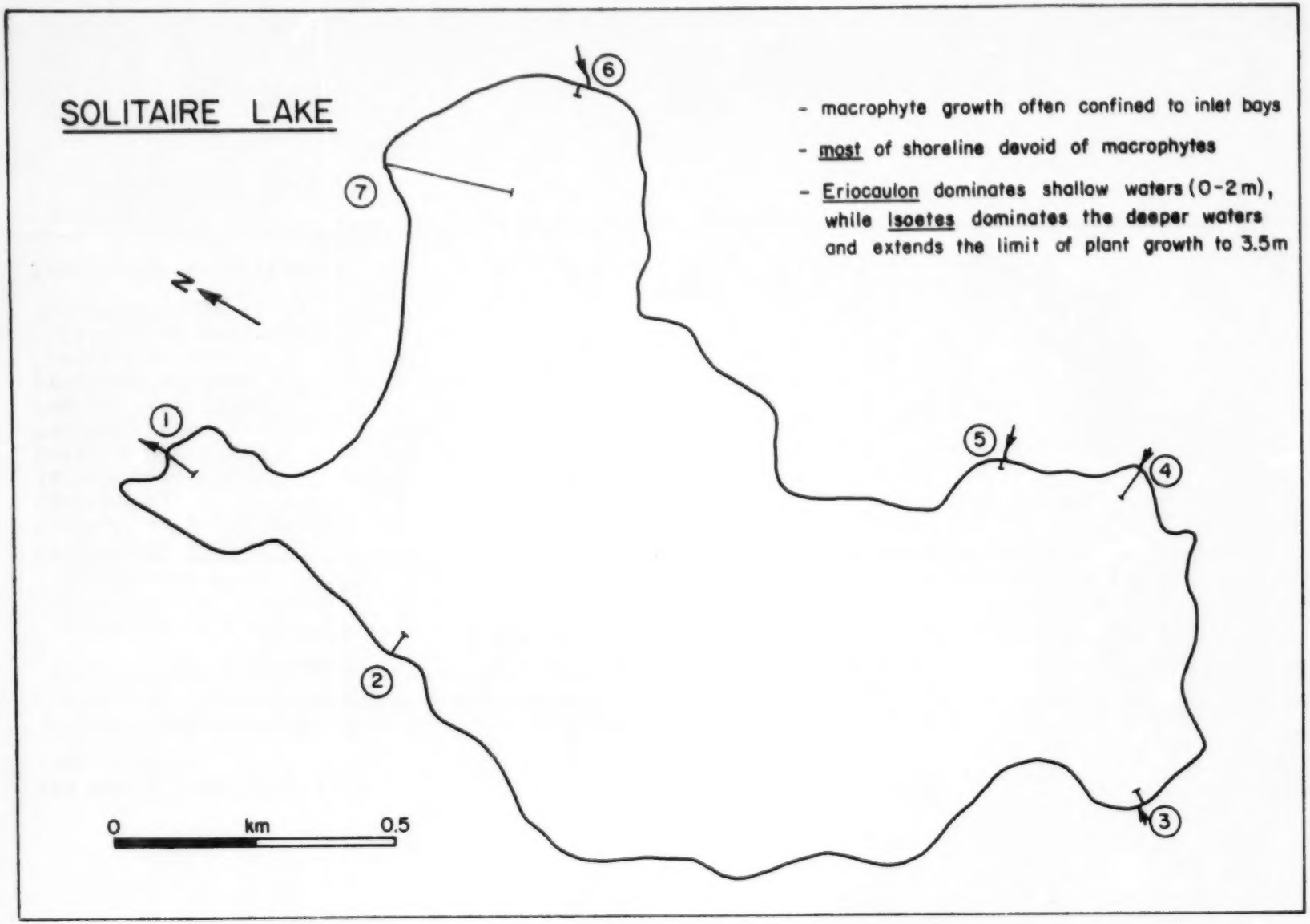

SOLITAIRE LAKE
- macrophyte growth often confined to inlet bays
- most of shoreline devoid of macrophytes
- Eriocaulon dominates shallow waters (0-2 m), while Isoetes dominates the deeper waters and extends the limit of plant growth to 3.5m
N
1
2
3
4
5
6
7
0
km
0.5

FIG. A-44

SOLITAIRE LAKE
(July 27/78)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

	TRANSECT	1		2		3		4		5			6	7	
	DEPTH	0	1.5	0	2.0	0	1.5	0	0.5	0	1.0	2.0	0	0	0.5
	ZONE (m)	1.5	3.5	2.0	3.0	1.5	3.0	0.5	3.5	1.0	2.0	3.0	1.5	0.5	2.0
	TOTAL	x	x	o	x	x	x	x	*	o	o	x	o	*	x
Elatine minima	1													x	
Eriocaulon septangulare	6	x		o				x		x	o		o	*	x
Isoetes sp.	7	x	x		x	x	x	x	*	x			x	x	x
Juncus pelocarpus	1													x	
Lobelia Dortmanna	2			x										x	
Fontinalis antipyretica	2							x	x	o	x	x			

Table A44

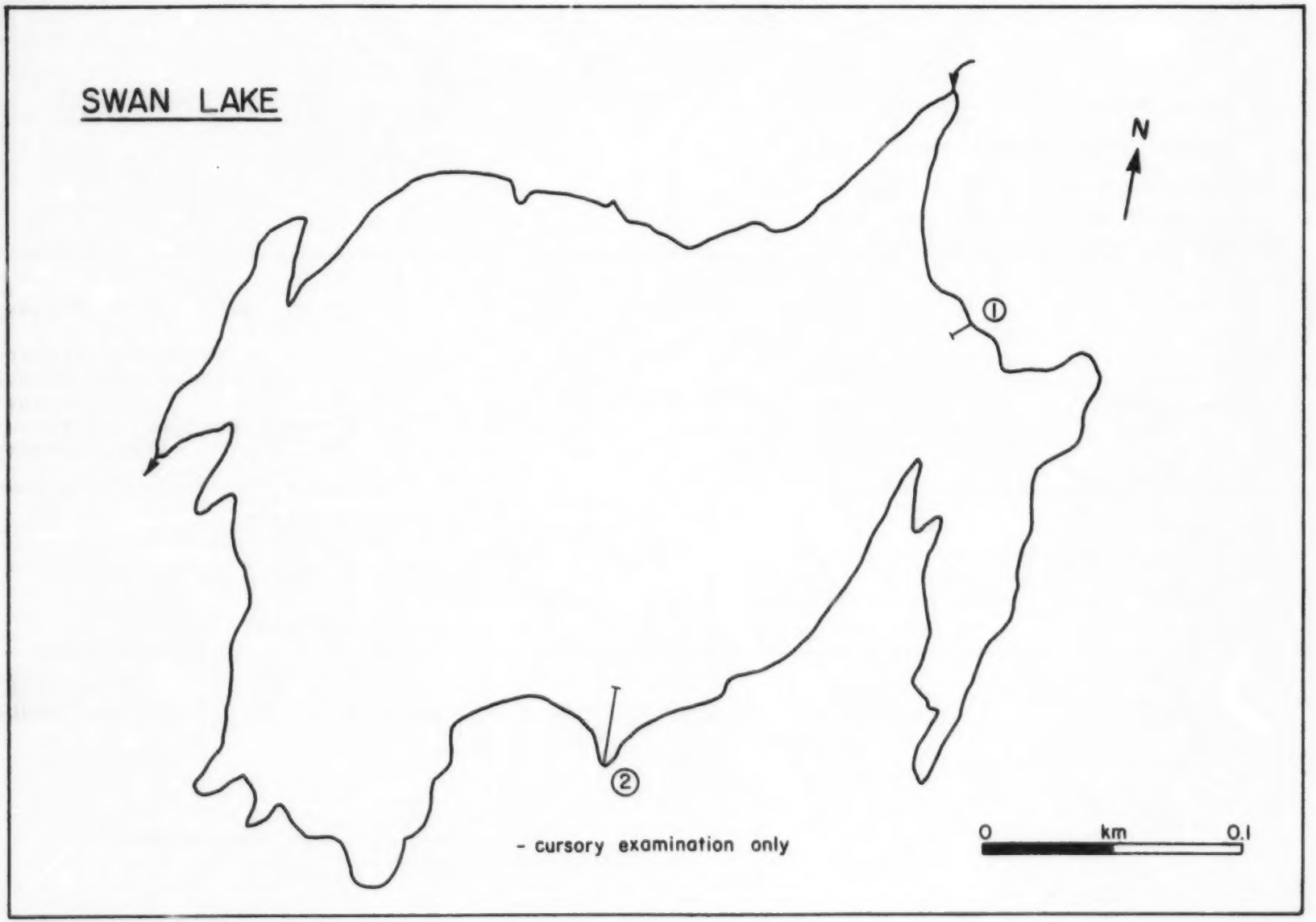


FIG. A-45

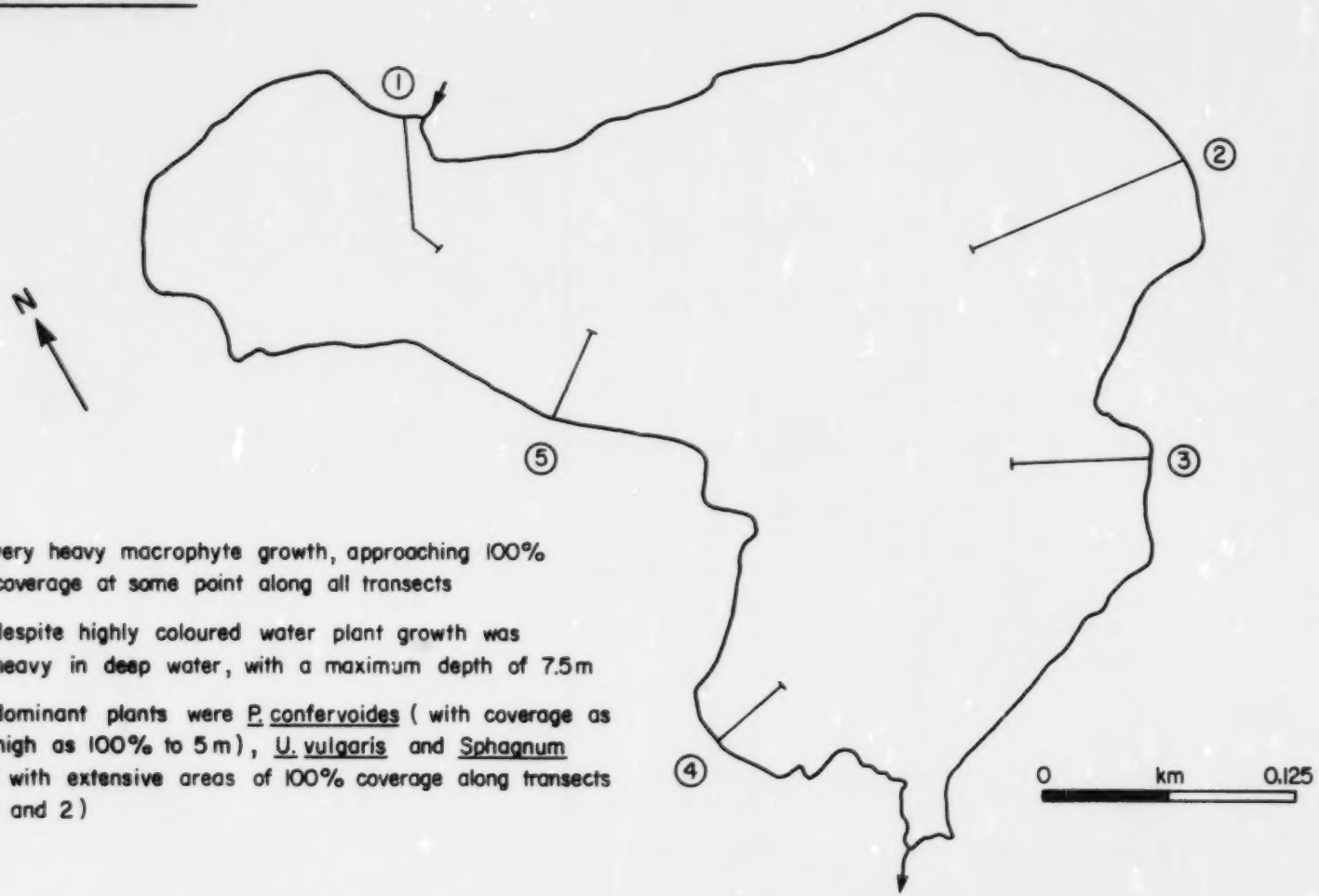
Table A45

SWAN LAKE
(July 29/77)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

TRANSECT		1	2
DEPTH		0	0
ZONE (m)		2.0	2.0
TOTAL		*	*
Eleocharis acicularis	2	o	o
Sagittaria sp.	1		x
Utricularia vulgaris	2	*	o
Drepanocladus sp.	1	o	

TERRY LAKE



- very heavy macrophyte growth, approaching 100% coverage at some point along all transects
- despite highly coloured water plant growth was heavy in deep water, with a maximum depth of 7.5 m
- dominant plants were P. confervoides (with coverage as high as 100% to 5 m), U. vulgaris and Sphagnum (with extensive areas of 100% coverage along transects 1 and 2)

FIG. A-46

TERRY LAKE
(July 15/79)

Bottom Cover - <5% (x), 5-50% (o), >50% (*)

		TRANSECT	1			2				3		4			5		
		DEPTH	0	3.0	6.0	0	1.5	3.5	5.0	0	2.1	0	1.5	4.3	1.0	1.5	3.8
		ZONE (m)	3.0	6.0	7.5	1.5	3.5	5.0	7.5	2.1	5.5	1.5	4.3	7.5	1.5	3.8	7.5
		TOTAL	*	*	x	o	*	*	*	*	x	*	*	x	o	*	x
Brasenia Schreberi	5	o			x				x		o			x		
Eriocaulon septangulare	4				x	x			x		o			o		
Isoetes sp.	1	x														
Juncus militaris	1	x														
Lycopus sp.	5	x			x				x		x			x		
Nuphar variegatum	5	x			x				x		x			x		
Nymphoides cordatum	1	x														
Pontederia cordata	5	x			x				x		x			x		
Potamogeton confervoides	5	*			x	*	*		o			*	x	o	*	
Potamogeton epihydrus	1	x														
Sagittari sp.	1				x											
Sparganium sp.	2				x				x							
Utricularia purpurea	3	x		x		o									o	
Utricularia vulgaris	5	o			o	o			o	x	o	o		o	o	
Fontinalis antipyretica	1							x								
Pohlia nutans schimperii	1								x							
Sphagnum subsecundum contortum	5		*	x				*	x				x			x

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